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PUBLICATIONS OF THE LAW INSTITUTE

THE BULLETIN

OF THE AMERICAN LAW INSTITUTE

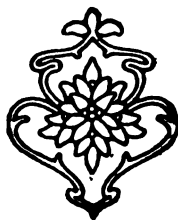
Published by the Institute and the American Bar Association, 1926
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Committee on the Administration of Justice.

LEWIS INSTITUTE BULLETIN

**REGISTER OF 1906-7 AND
ANNOUNCEMENTS FOR 1907-8**



CHICAGO, OCTOBER 1907

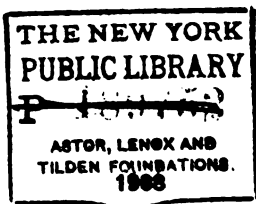
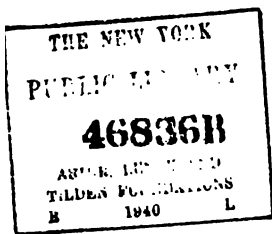


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CALENDAR

1907

JANUARY

S.	M.	T.	W.	T.	F.	S.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
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FEBRUARY

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MARCH

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APRIL

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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1908

JANUARY

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FEBRUARY

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MARCH

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MAY

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Institute Calendar—1907-1908.

1907—

Jan. 2, Wednesday — Winter Quarter begins.

Feb. 22, Friday — Washington's Birthday — a Holiday.

March 22, Friday — Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

April 1, Monday — Spring Quarter begins.

May 30, Thursday — Memorial Day — a Holiday.

June 15, 22, Saturdays, from 9 A. M. to 1 P. M. — Preliminary Examinations for Admission.

June 21, Friday — Spring Quarter ends.

July 1, Monday — Summer Session begins.

July 4, Thursday — Independence Day — a Holiday.

Aug. 9, Friday — Summer Session ends.

Sept. 16-20, Monday to Friday — Final Examinations for Admission.

Sept. 23, Monday — Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.

Sept. 30, Monday — Autumn Quarter begins for students who were in regular attendance during the year 1906-1907.

Oct. 7-11, Monday to Friday, Evenings — Registration and Classification of Candidates for admission to Evening Classes.

Oct. 14, Monday — Evening Classes begin.

Nov. 28-29, Thursday and Friday — Thanksgiving Recess.

Dec. 20, Friday — Autumn Quarter Ends.

HOLIDAY RECESS FOR TWO WEEKS.

1908—

Jan. 6, Monday — Winter Quarter begins.

March 27, Friday — Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

April 6, Monday — Spring Quarter begins.

May 21, Thursday — Evening Classes end.

June 20-27, Saturdays, from 9 A. M. to 1 P. M. — Preliminary Examinations for Admission.

June 28, Friday — Spring Quarter ends.

CORPORATION.

OFFICERS.

CHRISTIAN CECIL KOHLSAAT,
President.

THOMAS KANE,
Vice-President.

JOHN McLAREN,
Secretary and Treasurer.

TRUSTEES.

BERNARD ALBERT ECKHART,
OLIVER HARVEY HORTON,

THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN.

BOARD OF MANAGERS.

GEORGE NOBLE CARMAN,
BERNARD ALBERT ECKHART,
JAMES BRYAN HERRICK,
OLIVER HARVEY HORTON,
EDMUND JAMES JAMES,

HARRY PRATT JUDSON.
THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN,
ADDISON ELDRED WELLS.

GEORGE NOBLE CARMAN, *Director.*
WILLIAM HERBERT HALL, *Business Manager.*

Officers of Administration and Instruction.

ADMINISTRATIVE OFFICERS.

GEORGE NOBLE CARMAN, A. M.
Director.

EDWIN HERBERT LEWIS, Ph. D., Litt. D
Dean of College Students.

ALEXANDER WILLETT MOSELEY, S. B.
Head of Department of Mechanical Engineering.

LEWIS GUSTAFSON, A. B.*
Dean [Elect] of Academy Students, Registrar of the Institute.

GEORGE PLIMPTON ADAMS, A. B.
Dean of Academy Students, Registrar of the Institute.

OFFICERS OF INSTRUCTION.

(The names in each group appear in the order of appointment to the group.)

GEORGE NOBLE CARMAN, A. M.
Professor of Economics.

EDWIN HERBERT LEWIS, Ph. D., Litt. D.
Professor of English.

CHARLES WESLEY MANN, A. M.
Professor of History.

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics and Electrical Engineering.

CLARENCE ELBERT DEPUY, B. S.
Professor of Machine Design and Construction.

ALEXANDER WILLETT MOSELEY, S. B.
Professor of Theoretical and Applied Mechanics.

WARREN RUFUS SMITH, Ph. D.
Professor of Chemistry.

HERBERT EDGAR COBB, A. M.
Professor of Mathematics.

FRED A. ROGERS, B. S.
Assistant Professor of Physics and Electrical Engineering.

JAMES WALTER FERTIG, Ph. D.*
Assistant Professor of History.

JOSEPH RALEIGH NELSON, A. M.
Assistant Professor of Latin.

*Resigned.

- JESSIE LOUISE JONES, Ph. D.**
Assistant Professor of German.
- GEORGE LEE TENNEY, A. M.**
Assistant Professor of Latin.
- DUANE STUDLEY, B. S.**
Assistant Professor of Mathematics.
- CHARLES EMERSON PEET, B. S.**
Assistant Professor of Physiography.
- PHILEMON BULKLEY KOHLSAAT, Ph. B.**
Assistant Professor of English.
- LEWIS GUSTAFSON, A. B.***
Assistant Professor of English.
- BERKELEY JOHN THOMAS, A. M.**
Assistant Professor of Mathematics.
- JOHN DEREK NIES, B. S.**
Assistant Professor of Physics and Electrical Engineering.
- HELEN DOUGAL STREET, A. M.**
Assistant Professor of Greek and Ancient History.
- DIC HECTOR TROWBRIDGE, B. S.**
Assistant Professor of Chemistry.
- GEORGE PLIMPTON ADAMS, A. B.**
Assistant Professor of Psychology and Philosophy.
- LEA RACHEL DELAGNEAU**
Instructor in French.
- LOUIS EDWARD POPE**
Instructor in Mathematics.
- MARIE ELSA BLANKE**
Instructor in Freehand Drawing.
- GEORGE ALEXANDER ROSS**
Instructor in Woodwork.
- CHARLES EDGAR HOYT**
Instructor in Foundry Work.
- JOHN LORD BACON**
Instructor in Forge Work.
- EDWARD BURTON DEGROOT**
Instructor in Physical Culture.
- JULIA DUMKE PEET, Ph. B.**
Instructor in German.
- CHARLES SCHENCK,**
Instructor in charge of Mechanical Drawing.
- EDWARD HERMAN LAY, A. B.**
Instructor in Mathematics.
- WILLIAM PARKER HAWLEY, B. S.**
Instructor in Mechanical Drawing.
- *Resigned.

OFFICERS OF INSTRUCTION.

9

- JESSE MYRON OWEN, Ph. B.**
Instructor in English.
- KATE BELL MILLER, Ph. B.**
Instructor in English.
- HERBERT MERRILL WHEELER, B. E. E.***
Instructor in Mathematics and Engineering.
- ETHEL PERCY ANDRUS, Ph. B.**
Instructor in English.
- JOSEPH EDWARD HORA, B. S.**
Instructor in Chemistry.
- KATHERINE ISABEL INGERSOLL**
Instructor in Sewing.
- ABIGAIL FLORENCE WILLIAMS, M. L.**
Instructor in English.
- MARY KNOWLES WOODLE***
Instructor in English.
- HORACE BERNARD MCCABE**
Instructor in Mechanical Drawing and Machine Shop Work
- EDWARD LESTER WHEELER**
Instructor in Physical Culture.
- MINNA CAROLINE DENTON, A. M.**
Instructor in Biology, Bacteriology, and Physiology.
- MABEL THACHER WELLMAN, A. B.**
Instructor in Domestic Economy.
- ALVIN OTTO GREENSON, B. M. E.***
Instructor in Mechanical Drawing.
- ALPHONSO WIRTH CAVANAUGH**
Instructor in Mathematics.
- C. MADELINE BURTNER, A. B.***
Instructor in Physical Culture.
- ANNA ELIZABETH DRUMMOND, A. B.**
Instructor in English.
- BERTHA H. GELDERS, Ph. B.**
Instructor in German.
- ELIZABETH LUCE**
Instructor in Cookery.
- FREDERICK ERNEST BECKMANN, Ph.D.***
Instructor in German.
- EMILIE A. FLINTERMAN, Ph.B.***
Instructor in German.
- HELMUT BERENS, A. B.**
Instructor in German.
- FREDERICK LESTER HAVENS**
Instructor in Metal Work.
- *Resigned.

ALMA MARY HOLDEN, Ph.B.

Instructor in History.

CALEB EDWARD SUMMERS, B.S. in E. E.

Instructor in Mechanical Drawing.

FRANCES TALCOTT

Librarian.

IDA ELLEN SERVEN

Assistant in Public Speaking.

*ORRA MAY SMITH FOOTE

Assistant in Sewing.

LEILA PURDY

Assistant in Textiles.

NELLE GILL

Assistant in Mathematics.

LOIS MARTIN

Assistant in Sewing.

JANE HEAP

Assistant in Drawing.

GRACE LUCILE HENNECKE

Assistant in Millinery.

JESSE HERBERT LIBBERTON

Assistant in Physics.

JOHN PAUL BAIRD

Assistant in Woodwork.

ROBERT FREDERICK BIESEMEIER

Assistant in Metal Work.

RHODA EDYE

Assistant in Physical Culture.

MARGUERITE ROESCHLAUB

Assistant in Sewing.

General Information.

Historical Sketch.

The Lewis Institute owes its existence to the late Allen C. Lewis, who, by his will, which was admitted to record November 1, 1877, left a large part of his estate for the support of the Institute, and provided for its organization. Articles of incorporation for the Institute thus projected were granted by the Secretary of the State of Illinois, July 9, 1895.

James M. Adsit, Henry F. Lewis, and Hugh A. White were named in the will as the first trustees of the estate, the estimated value of which in 1877 was five hundred and fifty thousand dollars. Credit is due to these trustees, and especially to Hugh A. White, for such efficient management that the estate amounted, when turned over to the trustees of the Lewis Institute, November 21, 1895, to one million six hundred thousand dollars.

John A. Roche, Christian C. Kohlsaat, and John McLaren, under whom the Institute was incorporated, constituted the board of trustees from May 28, 1894, until the completion of the first buildings. The sites previously chosen having proved unsuitable, the trustees selected and purchased, at an expense of one hundred and sixty-nine thousand dollars, the principal portion of the block extending from Monroe street to Madison, between Winchester avenue and Robey street. This site is centrally located in the West Division of Chicago, and is easily accessible from all parts of the city by means of several lines of surface cars, and the Lake street and the Metropolitan elevated roads.

The erection of the first buildings was begun in May, 1895. The Institute was opened in September, 1896.

Scope of Work.

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in four main divisions, viz.: Mechanical Engineering; Mechanic Arts; Domestic Economy; the Liberal Arts. The Institute grants the degree of Mechanical Engineer, the title of Associate in Arts, and the Academy Certifi-

cate. The degree represents four years of college work, the title two years of college work, and the certificate four years of academy work.

Requirements for Admission.

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

Applicants for admission other than those mentioned above will be examined on such subjects as are prerequisites for the studies which they wish to pursue.* In all cases the test will call for intelligence rather than for technical knowledge.

Assignment of Studies.

On entering the Institute a student is assigned to such studies

* For example, applicants for entrance into the first year of academy work will be examined on English, arithmetic, history of the United States, and geography, as taught in the Chicago grammar schools.



as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Courses of Instruction" and "Units."

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

A unit consists regularly of three academy courses (a year's work) in any given subject.

The Degree of Mechanical Engineer.

To be enrolled as a candidate for the degree of Mechanical Engineer, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 19-38:

Courses	Units
English, 1-9	3
Mathematics, 1-6, 10-12	3
German, A-F	2
Science, or additional foreign language	2
History, 4-6	1
Physics, 1-3	1
Drawing, Mechanic Arts 1, 5, 6	1
Shopwork, Mechanic Arts 2, 3, 4, 7, 19, 20	2

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Mechanical Engineer. The requirements are shown in detail in the curriculum (see next page).

**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM, LEADING TO
DEGREE OF MECHANICAL ENGINEER***

AUTUMN QUARTER		WINTER QUARTER		SPRING QUARTER	
Course	Hours	Course	Hours	Course	Hours
FIRST YEAR.					
English.....	1 5	English.....	2 5	English.....	3 5
Algebra..... A W	1 5	Algebra..... W S	2 5	Algebra..... A S	3 5
Machine Sketching.. E	1 10	Wood Shop..... E S	2 10	Instrum't'l Draw'g.. E	5 10
Physiography..... A S	2 10	Physiography.....	1 10	Wood Shop..... W S	2 10
SECOND YEAR.					
English.....	4 5	English.....	5 5	English.....	6 5
Plane Geometry.. A W	4 5	Plane Geometry.. W S	5 5	Plane Geometry.. A S	6 5
Projection Draw'g.. E	6 10	Forge Shop..... E	3 10	Foundry..... E	4 10
German..... A	5	German..... B	5	German..... C	5
THIRD YEAR.					
American History....	4 5	American History....	5 5	American History....	6 5
Physics.....	1 10	Physics.....	2 10	Physics.....	3 10
Machine Shop..... E	19 10	Machine Shop..... E	20 10	Pattern Shop..... E	7 10
German..... D	5	German..... E	5	German..... F	5
FOURTH YEAR.					
English..... A W	7 5	English..... W S	8 5	English.....	9 5
Algebra..... A W	10 5	Algebra..... W S	11 5	Solid Geometry.. W S	12 5
Pattern Shop.....	8 10	Machine Shop..... E	22 10	Machine Shop..... E	23 10
German..... G	5	German..... H	5	German..... I	5

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF MECHANICAL ENGINEER**

FIRST YEAR.					
English..... A	5	English..... B	5	English..... C	5
Algebra..... A W	13 5	Trigonometry.. W S	14 5	Analyt'l Geometry..	15 5
Chemistry.....	1 14	Chemistry.....	2 14	Chemistry.....	3 14
Machine Draw'g.... E	10 10	Machine Sketching..	11 10	Surveying.....	13 10
SECOND YEAR.					
Economics.....	13 5	Economics.....	14 5	Industrial History..	15 5
Calculus.....	16 5	Calculus.....	17 5	Calculus.....	18 5
Physics.....	4 15	Physics.....	5 15	Physics.....	6 15
Kinematics.....	28 7	Descriptive Geom't'y	26 7	Machines.....	15 7
THIRD YEAR.					
Mechanics.....	16 5	Mechanics.....	17 5	Mechanics.....	18 5
Thermodynamics....	43 7	Machine Shop.....	22 10	Valve Gears.....	31 10
Electrical Laborat'y.	36 10	Electrical Laborat'y	36 10	Electrical Laborat'y	37 10
Machine Draw'g.. A S	12 10	Foundry.....	9 10	Mach. Tool Anal.....	24 10
FOURTH YEAR.					
Hydraulics.....	42 5	Hydraulic Machin'y	47 5	Power Plants.....	49 10
Machine Design.....	32 6	Machine Design.....	44 10	Machine Design.....	27 6
Chemistry.....	22 5	Chemistry.....	23 5	Chemistry.....	24 13
Materials of Const..	46 10	Struct'l Steel Work	53 10	Specifications and	
Thesis.....	5	Thesis.....	2	Contracts.....	50 2
				Thesis.....	2

*When a Course is given in more than one quarter, the quarter is indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring.

**ACADEMY COURSES OF INSTRUCTION NOT SHOWN ON
PRECEDING PAGE, WITH THE YEARS IN WHICH
THEY SHOULD ORDINARILY BE TAKEN.**

AUTUMN QUARTER			WINTER QUARTER			SPRING QUARTER		
	Course.	Hours.		Course.	Hours.		Course.	Hours.
FIRST YEAR.								
Latin.....	1	5	Latin.....	2	5	Latin.....	3	5
Freehand Drawing...E	1	10	Freehand Drawing...E	2	10	Freehand Drawing...E	3	10
Sewing and MillineryE	A	10	Sewing and MillineryE	B	10	Sewing and MillineryE	C	10
SECOND YEAR.								
Latin.....	4	5	Latin.....	5	5	Latin.....	6	5
Ancient History.....	1	5	Ancient History.....	2	5	Ancient History.....	3	5
Cookery.....	1	10	Cookery.....	2	10	Cookery.....	3	10
THIRD YEAR.								
Latin.....	7	5	Latin.....	8	5	Latin.....	9	5
Accounting.....	7	5	Accounting.....	8	5	Accounting.....	9	5
Biology.....	1	7	Biology.....	2	7	Biology.....	3	7
FOURTH YEAR.								
Latin.....	10	5	Latin.....	11	5	Latin.....	12	5
Chemistry.....	A	10	Chemistry.....	B	10	Chemistry.....	C	10
Sewing.....	D	10	Sewing.....	E	10	Sewing.....	F	10

**COLLEGE COURSES OF INSTRUCTION NOT SHOWN ON PRE-
CEDING PAGE, WITH THE YEARS IN WHICH
THEY SHOULD ORDINARILY BE TAKEN.**

FIRST YEAR.											
English.....	10	5		English.....	11	5		English.....	12	5	
Latin.....	13	5		Latin.....	14	5		Latin.....	15	5	
German.....	1	5		German.....	2	5		German.....	3	5	
French.....	1	5		French.....	2	5		French.....	3	5	
Greek.....	1	5		Greek.....	2	5		Greek.....	3	5	
European History.....	7	5		European History.....	8	5		European History.....	9	5	
Textiles.....	G	10		Textiles.....	H	10		Textiles.....	I	10	
SECOND YEAR.											
English.....	13	5		English.....	14	5		English.....	15	5	
Latin.....	16	5		Latin.....	17	5		Latin.....	18	5	
German.....	4	5		German.....	5	5		German.....	6	5	
French.....	4	5		French.....	5	5		French.....	6	5	
Greek.....	4	5		Greek.....	5	5		Greek.....	6	5	
English History.....	10	5		English History.....	11	5		English History.....	12	5	
Bacteriology.....	4	10		Physiology.....	6	10		Sanitation.....	7	10	
Food and Dietetics.....	4	10		Food and Dietetics.....	5	10		Household Economics.....	6	10	
THIRD YEAR.											
Psychology.....	1	5		Logic.....	2	5		Ethics.....	3	5	
German.....	7	5		German.....	8	5		Geology.....	4	5	
French.....	7	5		French.....	8	5		German.....	9	5	
Chemistry.....	9	10		Chemistry.....	7	12		French.....	9	5	
								Chemistry.....	8	12	

The Title of Associate in Arts.

High School graduates and others who meet the requirements of the North Central Association of Colleges and Secondary Schools are enrolled as candidates for the title of Associate. These requirements are as follows:

1. The graduation requirement of the high school and the entrance requirement of the college shall consist of not less than fifteen units.

2. A unit course of study is defined as a course covering a school year of not less than thirty-five weeks, with four or five periods of at least forty-five minutes each per week.

3. All high school curricula and all requirements for college entrance shall include as constants three units of English and two units of mathematics.

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

The Title of Associate in Domestic Economy.

To obtain the Title of Associate in Domestic Economy the student must secure, in addition to fifteen admission units, credit for the prescribed work in Chemistry, Biology, Bacteriology, Physiology, and Domestic Economy (seventeen courses), and one course in English Composition.

The Academy Certificate.

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and opportunities.

Half-Day, Evening, and Summer Courses.

As a rule, students in the day classes are expected to make their work systematic by aiming definitely toward the degree, the title, or the certificate. It is recognized, however, that many

students are obliged to leave school in order to take care of themselves and those dependent upon them, at a time when their more fortunate associates enter upon such courses of instruction as are herein outlined. To such students the Institute offers opportunities for special instruction in accordance with their needs, particularly in the line of shopwork, mechanical drawing, and domestic economy. Such as can attend the Institute but half of each day may, by prolonging the time requirement, complete the work of some one group of studies, or at least make advancement in one or more subjects.

Provision has also been made for such instruction at night as will enable young men and women who are employed during the day to continue their education along those lines which will be of the most service to them in the work in which they are engaged. In point of number of students and benefits derived by them no work of the Institute is more important.

The summer courses are designed for students who wish to shorten the time necessary for completing the work required for graduation, to make up deficiencies in scholarship, or to pursue special courses in the shops or laboratories. Any course of instruction offered by the Institute will be repeated during the summer, if the demand is such as to justify the formation of a class.

Tuition and Fees.

Day students are required to pay a registration fee of five dollars. This fee is due at the time of registration. The rate of tuition for day students is twenty dollars a quarter. Where a student limits himself to one course of instruction, with five hours of class work each week, there is a reduction of ten dollars a quarter. In laboratory, drawing, and shopwork, ten hours, or a fraction thereof, count as five in determining the charge.

The rate for night students is five dollars for a term of ten weeks for one course of instruction, two evenings a week, and ten dollars for two courses, four evenings a week.

The tuition for the summer term for each course of five hours a week of class instruction is five dollars. Students who attend only in the summer are not required to pay the registration fee.

Both day and night students who take one or more shop or laboratory courses in the departments of physics, chemistry,

engineering, and cookery are required to pay a shop or laboratory fee of five dollars a quarter or term.

Students in chemistry deposit two dollars each per quarter or term to cover breakage. If the charges do not amount to two dollars, the excess is returned to the student.

All payments are due in advance, on the first day of the quarter. Checks and money orders should be made payable to Lewis Institute.

Scholarships.

Three scholarships, each amounting to one year's tuition, have been established under the will of the late Mrs. Hugh A. White. Mr. John McLaren was named in the will to assign these scholarships.

Three additional scholarships, amounting respectively to one, two, and three quarters' tuition, are assigned by the Institute for excellence in public speaking. These scholarships are assigned in the fourth year of the academy work and are available in the first year of college.

Standings and Reports.

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline.

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction.

NOTE.—The Courses of Instruction offered are tabulated on pages 14 and 15, and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20; Mathematics, 1-12; Physics, 1-3; Chemistry, A-C; Physiography, 1, 2; Biology, 1-3; Domestic Economy, A-F, 1-3; History and Economics, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-12, 21-24; Mechanical Engineering 13-50; Mathematics, 13-18; Physics, 4-6; Chemistry, 1-24; Physiography and Geology, 4; Bacteriology and Physiology 4, 5; Domestic Economy, G-I, 4-7; History and Economics, 7-15; Psychology and Philosophy, 1-3; English 10-15, A-C; German, 1-9; French, 1-9; Latin, 13-19; Greek, 1-8.

Mechanic Arts.

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who are preparing for the profession of mechanical engineer. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. **MACHINE SKETCHING.** Constructive work in perspective. Dimensioned sketches of machine parts.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. **WOOD WORK.** A continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes and finishes. Practice with woodworking machinery.

3. **FORGE WORK.** Simple forging. Hardening and tempering. Work with steam hammer.

4. **FOUNDRY WORK.** Study of modern foundry construction, equipment, materials, and methods. Practice in molding, coremaking, melting, and pouring.

42. **HYDRAULICS.** The mechanics of fluids at rest and in motion; flow of water through orifices and pipes; pumps and motors. Prerequisite: *Courses 17.*

43. **THERMODYNAMICS.** The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Courses 15; Mathematics 18.*

44. **MACHINE DESIGN.** Study of the different types of boilers. Design of horizontal multitubular boiler. Stability of chimneys. Prerequisite: *Courses 18 and 43.*

46. **MATERIALS OF CONSTRUCTION.** The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Courses 18.*

47. **HYDRAULIC MACHINERY.** The study of the design of a turbine. Calibration of pressure-tank, weir, and orifice. Test on flow of water. Tests of hydraulic machinery. Prerequisite: *Courses 42.*

49. **POWER PLANTS.** Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses 43 and 44.*

50. **SPECIFICATIONS AND CONTRACTS.** A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

THE THESIS. During the senior year the student completes a thesis on some engineering subject. He is assigned to that instructor under whose supervision his subject of thesis properly lies. The three o'clock hour is set apart for thesis work, and the conferences between student and instructor are held at that time. The thesis will also be under the general supervision of an instructor in English, whom the student will meet at stated times to confer upon the manner of presentation. The thesis shall be typewritten and of standard dimensions and binding. It shall be deposited in the library before graduation.

Mathematics.

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognised, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. **ELEMENTARY ALGEBRA,** four days a week. Simple equations containing fractions, simple simultaneous equations, involution and evolution. **CONCRETE GEOMETRY,** one day a week.

3. **ELEMENTARY ALGEBRA,** four days a week. Theory of exponents

radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY**. Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. **PLANE GEOMETRY**. Circles, ratio and proportion, similar polygons.

6. **PLANE GEOMETRY**, completed. Four or five weeks of this quarter will be devoted to an elementary presentation of some of the most useful and fundamental facts of plane trigonometry and their applications.

7. **ACCOUNTING**. Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING**. Introduction and use of main books used in accounting, and application of principles learned in course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING**. Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA**. A review and more thorough study of the fundamental operations, solution of equations, theory of exponents, surds theory of quadratic equations, graphic algebra, problems and exercises based on the work that the pupils have done in the shops and laboratories.

11. **ADVANCED ALGEBRA**. Simultaneous quadratic equations, ratio, proportion, variation, the binomial theorem, progressions, logarithms, permutations, combinations, exercises and applications.

12. **SOLID GEOMETRY**. Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. **ALGEBRA**. Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY**. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY**. Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS**. Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS**. Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS**. Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics.

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize students with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. **GENERAL PHYSICS.** Mechanics: A discussion and illustration of physical quantities and their measurement; simple types of motion; density, velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. **LABORATORY PHYSICS.** Strictly quantitative, covering subjects named above.

2. **GENERAL PHYSICS.** Heat: Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. Sound: Waves, sounds and their relations, sonorous bodies, compound tones and musical instruments. Light: Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves, color, and polarization. **LABORATORY PHYSICS.** Quantitative work in heat, sound, and light.

3. **GENERAL PHYSICS.** Electricity: Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. **LABORATORY PHYSICS.** Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators, and calibration of instruments.

4. **MECHANICS.** Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics* 14.

5. **ELECTRICAL MEASUREMENTS.** Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients; calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics* 14.

6. **HEAT AND LIGHT.** Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics* 14.

Chemistry.

The aim of the courses in chemistry is to give in the first place a knowledge of the fundamental principles of the science as a part of a general education; and afterwards a more extended knowledge of the subject and practice in manipulation to those who wish to devote themselves to pure or applied chemistry, or whose work along other lines will be made more efficient by a thorough training in chemistry. In the advanced work in chemistry a reading knowledge of German is assumed. Engineering students are encouraged to become familiar with the principles on which manufacturing processes or industrial methods are based, so that a firm foundation may be laid for subsequent specialization in these directions. Opportunities are given for excursions to the plants of chemical industries located in and near Chicago.

Courses A-C are intended to give students of domestic economy a general knowledge of the subject in a limited time.

A, B, C. CHEMISTRY. A study of the common elements and their compounds. Frequent qualitative and quantitative experiments and verification of chemical laws will be included in the laboratory work. Reference book, Newth's *Inorganic Chemistry*. Lectures, recitations, and laboratory work, ten hours a week.

The courses in general chemistry, for college students, give a knowledge of the natural occurrence, methods of preparation, properties and reactions of the important elements and compounds, explain these facts according to modern theories, and point out their application to industrial processes. The greater part of the laboratory work is qualitative, but it includes quantitative experiments involving both gravimetric and volumetric methods, and also a few inorganic preparations on a somewhat elaborate scale. Lectures and recitations, five hours a week; laboratory work, ten hours a week. Reference book, Newth's *Inorganic Chemistry*. Prerequisite: *Physics* 1-3.

1. GENERAL CHEMISTRY. Chemical change, three states of matter, solution and crystallization, elements and compounds, oxygen, hydrogen, and the elements of the chlorine group.

2. GENERAL CHEMISTRY. Continuation of course 1. The remaining non-metallic elements; acids, bases, and salts; electrolysis.

3. GENERAL CHEMISTRY. Continuation of course 2. The metals. Qualitative analysis is not taught, but some of the more important analytical reactions are studied, so that at the end of the course the student is expected to be able to recognize any simple salt and to understand the methods of separation of various groups and elements.

Students who have credit for the chemistry course of the ordinary high school are required to take the lecture and recitation work of 1, 2, and 3, but special laboratory work is arranged for them in the fall quarter. If they show suitable proficiency, they are excused from laboratory work for the rest of the year.

The courses in qualitative analysis begin with simple analysis and lead to the study of complex mixtures, minerals, alloys, etc. The lectures treat in considerable detail of certain selected portions of theoretical and physical chemistry, special reference being made to the basis of analytical chemistry.

Laboratory work, ten hours a week; lectures and recitations, three hours a week. Textbook, Prescott and Johnson's Qualitative Analysis. Prerequisite: *Courses 1-3.*

4. QUALITATIVE ANALYSIS. Classroom work on the principles of analysis. General qualitative analysis.

5. QUALITATIVE ANALYSIS. Continuation of course 4. Lectures on theoretical chemistry.

The courses in organic chemistry consist of lectures and recitations on the simpler types of carbon compounds, and their preparation and purification in the laboratory. Lectures and recitations, three hours a week; laboratory work, twelve hours a week. Prerequisite: *Courses 1, 2, 3, and 4.*

7. ORGANIC CHEMISTRY. The work is based on Perkin and Kipping's Organic Chemistry. Aliphatic series.

8. ORGANIC CHEMISTRY. Continuation of course 7. Aromatic series.

Courses 6 and 9 give the general methods of quantitative analysis. Courses 10 to 21, inclusive, give the application of these methods to the problems of particular industries. The work is largely individual, and may be given any quarter, as desired.

The laboratory work in each course is supplemented by the reading of special works treating of the respective subjects. Course 9 is prerequisite to courses 10-19, and courses 7 and 8 to courses 17-19. Laboratory work, twelve hours; lectures and recitations, three hours a week.

6. QUANTITATIVE ANALYSIS. Continuation of course 5. Simple gravimetric and volumetric determinations leading to course 9. Lectures and recitations on quantitative analysis.

9. QUANTITATIVE ANALYSIS. Moderately complex separations, volumetric precipitations, and oxidation and reduction.

10. IRON AND STEEL ANALYSIS. Including the microscopic structure.

11. IRON ORE ANALYSIS.

12. WATER ANALYSIS. Analysis of drinking water and of boiler feed water, including the analysis of boiler scale.

13. FUEL ANALYSIS. Especially the analysis of coke and coal, including calorific determinations.

14. GAS ANALYSIS. Including both flue gas analysis and illuminating and fuel gas analysis.

15. CEMENT ANALYSIS. Including materials and finished product.

16. COMPLEX MINERAL ANALYSIS. Including silicates, ores, and rare elements.

17. OIL AND SOAP ANALYSIS. Analysis of oils, lubricators, and soaps.

18. PAINT ANALYSIS. Including oils, varnishes, and pigments.

19. FOOD ANALYSIS. The testing of foods for quality and purity.

20. INORGANIC PREPARATIONS.

21. ORGANIC PREPARATIONS.

22 and 23. An abridged course in qualitative and quantitative analysis preparatory to 24. Prerequisite: *Courses 1-3.*

24. ANALYSIS OF ENGINEERING MATERIALS. The chemical tests commonly employed by engineers, including coal and gas fuel value determinations, flue gas analysis, lubricating oil tests, etc. Lectures on metallurgy are given as a part of this course. Prerequisite: *Courses 4 and 6 or 22 and 23.*

Physiography and Geology.

In the courses in physiography and geology, lectures, recitations, and laboratory methods of work are used. The aim in physiography 1 and 2 is to give a broad introductory course that shall open up the field of science and give the student a notion of its methods and scope. Physical geography is made the central subject. The study includes observations on the heavenly bodies, such illustrated lectures and laboratory exercises as are necessary for the student to make good use of his observations, lecture table demonstrations and laboratory exercises on the elementary physical and chemical phenomena fundamental in understanding the problems taken up in the physical geography, and, finally, an application of physiographic principles to the geography of the world, with especial attention to the physiographic control of man's activities.

1. **PHYSIOGRAPHY.** The motion of the earth and its relation to the sun and moon; elementary meteorology and climatology; distribution, movements, and deposits of the ocean.

2. **PHYSIOGRAPHY.** The land: The modern doctrines of the origin and development of the surface features of the earth, the agencies involved, and the resulting forms carefully studied and classified. Especial attention given to the distribution of life on the earth, its relation to topographic and climatic features, and the control of these things over man. Saturday field excursions.

Course 2 may precede or follow course 1, according as the work is commenced in the autumn or winter.

4. **GENERAL GEOLOGY.** The elementary features of dynamical, structural, and historical geology. Emphasis placed upon the leading facts and principles of the science and the more important events of geological history. For college students.

Prerequisite: *Courses 1 and 2; Physics 1-3, and Chemistry 1-3, or their equivalent.*

Biology, Bacteriology, and Physiology.

1, 2, 3, **GENERAL BIOLOGY.** Studies in comparative anatomy; development and life history of animal and plant types. General physiology; development of some modern theories of metabolism and heredity. A number of features belonging to economic biology will be presented.

4. **BACTERIOLOGY.** A laboratory course dealing with bacteria, yeasts, and molds. Studies in morphology, physiology, and reproduction; making of culture media, of permanent mounts; exercises in elementary analysis of air, milk, water, etc., from different sources.

6. **PHYSIOLOGY AND PERSONAL HYGIENE.** Human anatomy and physiology from lectures, text, and illustrative material. Points of contact between the study of physiology and subjects which concern practical conduct, e. g., physical training, diet, reaction of body to immediate environmental conditions, conservation of nervous energy

Domestic Economy.

The courses in Domestic Economy are planned with reference to the needs of two classes of students: (1) Young women who are preparing to teach cooking and sewing; (2) Girls who wish to acquire a knowledge of the household arts in connection with other studies of the high school.

The teachers' courses in domestic economy are of college grade and presuppose a high school training. In cooking, dietetics, and household economics and textiles, and in sewing there are courses of instruction extending over a period of two years. The time required to prepare for teaching depends on the previous preparation and special aptitude of the candidate. College graduates and experienced teachers who have a sufficient knowledge of biology and chemistry may in one year make adequate preparation for teaching cooking or sewing. High school graduates are advised to take, in connection with the instruction that is offered in domestic economy, courses in English and in the physical and biological sciences amounting to not less than two years of college work. Those who are preparing to teach in high schools should give themselves the advantage of not less than four years of college training.

Following are the courses of instruction that are offered in this department:

A. **SEWING.** Course designed for the younger pupils. Includes the making of plain undergarments, with talks on materials and implements used. Use of machine with simple attachments.

B. **SEWING.** Taking of measurements, making of undergarments continued, cutting from patterns.

C. **SEWING.** Cutting and making of shirtwaists, thin gowns, and dressing-sacks.

In connection with A, B, and C, four hours a week may be given to millinery.

D, E, F. **TEXTILES.** Courses designed for those who are preparing to teach; include, in addition to the sewing defined under A, B, and C, drafting, the study of textiles, and the principles of design. Simple designs in flat colors, such as borders, rugs, etc.; color harmony; lettering for monograms; proportions of the human figure; sketching from life; designs for undergarments, waists, dresses, hats, etc.

G, H, I. **TEXTILES.** A continuation of D, E, and F. Advanced sewing and millinery. Design as applied to dress. Textiles and weaving. The teaching of sewing and millinery in the elementary and the secondary school.

1. **EXPERIMENTAL COOKERY.** Application of heat to food.

2. **EXPERIMENTAL COOKERY.** A continuation of 1. Selection, manufacture, and cost of food. Marketing.

3. **EXPERIMENTAL COOKERY.** Preparation of food in large quantities. Invalid cookery. Demonstration. Serving.

4. **FOOD AND DIETETICS.** A study of the composition and nutritive value of foods. Simple food analysis. The right application of heat to food. Recitations and lectures, 10 hours a week. Prerequisite: *Chemistry*, A-C.

5. **FOOD AND DIETETICS.** Continuation of course 4. **DIET AND DIETARIES.** The detection of adulterations and preservatives in food. Recitations and lectures, 10 hours a week.

6. **ECONOMICS OF THE HOUSEHOLD.** The cost of living and the apportionment of the income. A study of rent, fuel, light, and the like, with reference to cost and efficiency. Family budgets and their value. Methods of keeping household accounts. A special consideration of woman's changing economic position and the effect upon the family.

7. **SANITATION, HOUSEHOLD AND PUBLIC.** The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common transmissible diseases. Lectures and reference work, field excursions.

History and Economics.

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

A year is also given to economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. **ANCIENT HISTORY.** The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. **ANCIENT HISTORY.** The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. **ANCIENT HISTORY.** The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. **AMERICAN HISTORY.** The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, and the history of the English colonies to 1763.

5. **AMERICAN HISTORY.** The conflict between the colonies and England, with a study of the political differences between the two; the development of confederate government during the Revolution; the political and industrial growth of the United States, particularly of the West.

6. **AMERICAN HISTORY.** The beginning of sectional differences, acquisition and government of new territories; the fight for slavery extension; reconstruction and its effects; and the modern United States.

7. **EUROPE FROM THE FOURTH TO THE FOURTEENTH CENTURY.** An outline course in general European history covering the period from the

Council of Nicea to the removal of the Papacy to Avignon, treating in such details as the time will permit the civilisation and institutions peculiar to the period.

8. **EUROPE FROM THE FOURTEENTH TO THE EIGHTEENTH CENTURY.** From the exile at Avignon to the close of the Seven Years' war. An outline study of the Renaissance, Reformation, Counter Reformation, Religious and Dynastic wars, and the struggle for colonial and commercial supremacy.

9. **EUROPE SINCE 1763.** The effects of the American Revolution on Europe, attempts at reform, the French Revolution, Napoleon, the Holy Alliance, reforms in England, and the unity of Germany and Italy.

10. **ENGLISH HISTORY.** The founding of the Saxon kingdoms, the coming of the Dane and Norman, mediaeval England to the accession of Henry VII.

11. **ENGLISH HISTORY.** Tudor and Stuart England, the Reformation the period of civil wars, industrial, commercial, and colonial development.

12. **ENGLISH HISTORY.** The modern period, industrial revolution, political reform, the making of the British Empire.

13. **ECONOMICS.** The Consumption, Production, and Distribution of Wealth.

14. **ECONOMICS.** Money, Credit, and Banking; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform.

15. **ECONOMIC HISTORY SINCE 1750,** with special reference to the development of industry and commerce in the United States.

Psychology and Philosophy.

The work in Psychology and Philosophy is intended to give a general outline of the field of Psychology, Logic, and Ethics, and at the same time to make the student acquainted with the methods and problems of Philosophy.

The work is carried on by means of text-books, recitations, and lectures. Collateral reading from standard authors forms the basis for written theses by the student.

1. **PSYCHOLOGY.** A description and analysis of the fundamental processes of the mental life, with emphasis on their physiological aspects. Angell's Psychology is used as a text-book, with assigned readings from other works.

2. **LOGIC.** The basis of the course consists of a study of conception judgment, and reasoning in formal logic; but some of the wider applications of logic, such as the relation of language and thought, and the purpose of the thinking process, are studied.

3. **ETHICS.** The aim of the course is to acquaint the student with the more important ethical theories, and their bearings upon the ideal of conduct and life. The student is expected to compare and criticise the different points of view, with a view to forming an independent opinion.

English.

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on page 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is designed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In courses 1 to 6 the text-books at present used are as follows: Lewis, *First Manual of Composition*, revised edition; Lewis, *Introduction to the Study of Literature*; Moulton, *Old Testament Stories*; Shakspeare, *the Merchant of Venice*, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the *Riverside Literature Series*, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's *Life of Lincoln*. These books are referred to below by abbreviations.

1. Average sections cover *First Manual*, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover *First Manual*, II., and *Introduction*, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover *First Manual*, III., and *Introduction*, VI.-X. Special sections abbreviate *Introduction*.

4. Average sections cover *First Manual*, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover *First Manual*, V., Schurz's *Lincoln* (133), and Warner (37). Special sections omit 37.

6. Average sections cover *First Manual*, VI., and *The Merchant of Venice*.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to course 7 are assigned to course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's *Julius Caesar*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, and *Lycidas*; Burke's *Speech on Conciliation with the American Colonies*; Macaulay's *Life of Johnson*, and *Essay on Addison*.

8. COMPOSITION. The work is based on Lewis's *Second Manual of Composition*.

9. Shakspeare's *Merchant of Venice* and *Macbeth*; Addison's and Steele's *Sir Roger de Coverley Papers*; Irving's *Life of Goldsmith*; Coleridge's *The Ancient Mariner*; Scott's *Ivanhoe* and *Lady of the Lake*; Tennyson's *Garth* and *Lynette*, *Lancelot* and *Elaine*, and *The Passing of Arthur*; Lowell's *The Vision of Sir Launfal*; George Eliot's *Silas Marner*.

10. RHETORIC AND ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It

affords practice in writing by numerous exercises and themes. In 1907-1908 Newcomer's Elements of Rhetoric will be used as a basis for the exercises.

11. **ENGLISH LITERATURE AND COMPOSITION.** The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPERE.** Dowden's Shakspeare Primer, Hudson's School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest.

13. **ENGLISH COMPOSITION,** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, text-books written exercises, and personal consultation. Thirty-five themes are written illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

15. **ARGUMENTATION AND PUBLIC SPEAKING.** The course will include not only some systematic study of the principles of argument and of oral debate, but some practice in the preparation and delivery of addresses. On three days of the week the class will meet in two sections (a) men, (b) women, and on two days of the week as a whole.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the acquisition of clearness and accuracy in the writing of English. Five hours a week throughout the year.

German.

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. The principles of phonetics are presented in simple form, and repeated practice on exercises prepared especially for this purpose is required both in the classroom and in the preparation of the lesson. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A, B. **ELEMENTARY GERMAN.** Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. **ELEMENTARY GERMAN.** Grammar continued. Verb forms are emphasized. Easy prose reading.

D. **READINGS IN EASY NARRATIVE PROSE.** Continued drill on grammatical forms. Prose composition based on texts read.

E. **NARRATIVE PROSE AND ONE EASY COMEDY.** Reproductive translation into German. Conversational exercises.

F. **SCHILLER'S WILHELM TELL.** Reproductive translation and independent themes.

G. **SCHWEITZER-SIMONNOT'S Deutsches Lesebuch für Quarta und Tertia.**

H. **GERMAN PROSE COMPOSITION** Jagemann's or Poll's text-book.

I. **A MODERN NOVEL.** Sudermann's *Frau Sorge* or Freytag's *Soll und Haben*.

1, 2, 3. **ELEMENTARY GERMAN FOR COLLEGE STUDENTS.** Thomas's *Grammar*, Part 1. Leander's *Träumereien*. Schweitzer-Simonnot's *Lesebuch*.

4. **HISTORICAL PROSE.** Ranke's *Kaiserwahl Karls V.* Goethe's *Göts von Berlichingen*.

5. **PROSE COMPOSITION AND THEMES.**

6. **MODERN NOVELS.** Ebner-Eschenbach, Freytag, Sudermann.

7. **SCHILLER.** *Der dreissigjährige Krieg* and *Wallenstein's Lager*.

8. **SCHILLER.** *Die Piccolomini* and *Wallenstein's Tod*.

9. **THE MODERN DRAMA.** Kleist, Grillparzer, Hebbel, Hauptmann, Sudermann, Fuld.

French.

The elementary work in French (courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

Academy students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, François.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: *Fraser and Squair* for reference. Reading: François and Giroud's *Simple French*. *Sans Famille* (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Eckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry). Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent résumés and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of that period. Prose; frequent reproductive exercises; letters, business and friendly, twice a week.

6. **MOLIERE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Precieuses Ridicules*. Dictations; abstracts or reproductions from memory of portions of text read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* Polyeucte (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and history. Themes in French.

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Le Maître. Themes based on subjects suggested by the reading.

Latin.

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B., with electives for those desiring advanced work.

Literature is studied historically as an expression of the life of the people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of

style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. **ELEMENTARY LATIN.**

3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulae Faciles*.

4. **SELECTED FABLES AND STORIES** from Roman history.

5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**

7, 8. **CICERO, ORATIONS AGAINST CATALINE. SALLUST, CATALINE.** The orations of Cicero and Sallust's *Cataline* form the basis of a study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. **CICERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in courses 7 and 8.

10. **VIRGIL, ÆNEID, I., II.** Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.

11. **VIRGIL, ÆNEID, III., IV.**

12. **VIRGIL, ÆNEID, V., VI.** General review. Latin writing.

13. **LIVY.** Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.

14. **HORACE.** Selections from the Odes and Satires, read in such order as to show the ripening and mellowing of the poet's genius, as well as the development of his personality. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance becomes an important means of arousing an appreciation of the music of Horace's verse.

15. **LATIN COMEDY.** Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.

16. **TACITUS.** *Agricola*, *Germania*, and selections from the *Annales*.

17. **PLINY'S LETTERS.** The reading is accompanied by informal talks upon the life, private, social, and political, of Pliny's time. The pictures of the age given by Tacitus, Juvenal, and Pliny are compared and discussed.

18. **JUVENAL'S SATIRES.** Illustrative material of every available sort is used to interpret the text, which is made the occasion of a somewhat detailed study of conditions under Domitian. Collateral readings upon topics suggested by the text and reports on such readings are required of all students.

Courses 17 and 18 will be given in alternate years.

19. **LATIN LITERATURE.** Selections furnishing a brief but comprehensive survey of the history of Latin literature from Ennius to the church fathers. Lectures upon Roman life as it affected the development of literary forms.

Greek.

Courses 1-4 are adapted to the requirements of college students who wish to begin Greek, and are completed in the time usually assigned to this work in colleges which offer elementary Greek. Academy students who have had two or three years of Latin may be admitted to these classes if their work is so planned as to allow the requisite time for preparation. Courses 5-8 present the work usually required for the A. B. degree.

1. **ELEMENTARY GREEK.** The essentials of the grammar, with illustrative sentences in Greek and English. Selections from the *Anabasis*.

2. **XENOPHON, ANABASIS, Book I.** Composition; grammar. The modification of verbal stems, euphonic changes, and drill in the principal parts of irregular verbs.

3. **XENOPHON, ANABASIS, Books II., III., IV.** Greek writing; grammar.

4. **HOMER, ILIAD, Books I., II., III.;** selections from IV.-XXIV.

The essentials of the structure of Homeric verse and the resemblances and differences between the Homeric hexameter and the Virgilian. The relation of the Epic Greek to the Attic and the essentials of Homeric syntax. The study of words. Exercises in writing Greek.

5. **HOMER, ODYSSEY, Selections from Books I.-XIII.** The study of words. The "Homeric Question." Comparison of Homer and Virgil.

6. **PLATO, APOLOGY AND CRITO. XENOPHON, MEMORABILIA.** Greek writing. Readings and discussions on (1) the rise of Greek philosophy, (2) Socrates and the Sophists, and (3) Plato and Socrates.

6a. **XENOPHON, SYMPOSIUM. PLATO, SELECTIONS FROM THE PROTAGORAS, GORGIAS, EUTHYDEMUS, AND REPUBLIC.** The writing of Greek. Colateral reading. (Alternates with course 6.)

7. **SELECTIONS FROM LYSIAS AND DEMOSTHENES.** The development of Attic oratory. Demosthenes' importance in Greek literature and history.

8. **SOPHOCLES, THE ANTIGONE AND ŒDIPUS TYRANNUS.** The origin and development of the Greek drama. Outline study of the history of Greek literature.

Free-Hand Drawing.

The aim of this department is to give the student a good foundation in the rudiments of drawing. This foundation should enable the average student to express himself with some facility in various mediums and should serve at the same time as a preliminary training for the special student who wishes to do advanced work in drawing. While there are general courses planned for all students, the work is suited to the ability and taste of the individual as much as possible. A certain amount of elementary work is required of all, but after that has been satisfactorily done great liberty is allowed in the choice of medium and subject.

A general outline of the first three courses is something on this order:

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

In addition to this, the students execute posters and decorative compositions in color; illustrations; applied designs; oils from still life; sketches in color from models in costume, etc.

These courses are subject to change at any time to meet various requirements.

There will also be classes in arts and crafts, pottery, metal work, leather, wood carving, stenciling, etc., so far as there is a demand for such instruction.

Physical Culture and Athletics.

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90 x 40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Evening Session of 1907-1908.

October 14 to May 21.

OFFICERS OF INSTRUCTION.

- GEORGE NOBLE CARMAN, A. M.**
Director.
- PHILIP BELL WOODWORTH, M. E.**
Professor of Electrical Engineering.
- CLARENCE ELBERT DEPUY, B. S.**
Professor of Machine Design and Construction.
- ALEXANDER WILLETT MOSELEY, S. B.**
Professor of Theoretical and Applied Mechanics.
- WARREN RUFUS SMITH, Ph. D.**
Professor of Chemistry.
- FRED A. ROGERS, B. S.**
Assistant Professor of Electrical Engineering.
- BERKELEY JOHN THOMAS, A. M.**
Assistant Professor of Mathematics.
- JOHN DEREK NIES, B. S.**
Assistant Professor of Electrical Engineering.
- DIC HECTOR TROWBRIDGE, B. S.**
Assistant Professor of Chemistry.
- GEORGE ALEXANDER ROSS**
Instructor in Woodwork.
- CHARLES EDGAR HOYT**
Instructor in Foundry Work.
- CHARLES SCHENCK**
Instructor in charge of Mechanical Drawing.
- WILLIAM PARKER HAWLEY, B. S.**
Instructor in Mechanical Drawing.
- HORACE BERNARD McCABE**
Instructor in Machine Shop Work.

KATHERINE ISABEL INGERSOLL
Instructor in Sewing.

AGNES BROWN
Instructor in Cookery.

HAROLD PRATT WEAVER, M. E.
Instructor in Mechanical Drawing.

GORDON CROWELL ABBOTT
Instructor in Machinery Drawing.

LEWIS OMER, A. B.
Instructor in Mathematics.

BRYANT WHITE, A. B., S. B.
Instructor in Machinery Drawing.

ALBERT SIDNEY MERRILL, S. B.
Instructor in Mechanical Drawing.

FERNLEY HOPE BANBURY
Instructor in Mechanical Drawing.

JAY STANLEY JACKSON, A. B.
Instructor in English.

ALEXANDER DAVISON BAILEY, M. E.
Instructor in Mechanical Drawing

HJALMER HERTZ, C. Ph., M. E., E. E.
Instructor in Mechanical Drawing.

EDWARD C. WINTERS
Instructor in Penmanship.

FRANCIS HOWARD LANE, M. E.
Instructor in Electrical Engineering.

HAROLD HUDSON MORGAN, M. E.
Instructor in Engineering Mathematics

JOSEPH PHIPPIN SHAW
Instructor in Accounting.

WILLIAM G. HOF, M. E.
Instructor in Mechanical Drawing.

FREDERICK LESTER HAVENS
Assistant in Machine Shop.

CHARLES BORG
Assistant in Electrical Engineering.

CLARENCE K. ARP
Assistant in Mechanical Drawing.

VICTOR SHERMAN
Assistant in Machine Sketching.

WILL JACOBI
Assistant in Electrical Engineering

CLARENCE MCGREW
Assistant in Chemistry.

General Information.

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, book-keepers, firemen, nurses, stenographers, and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Director and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for a week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 6 to 10 o'clock Monday, Tuesday, Wednesday, and Thursday evenings.

The Library is open from 6 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses

I. MECHANIC ARTS.

1. Machine Sketching.....	3 terms—Tuesdays and Thursdays.
2. Elementary Mechanical Drawing.....	" " Sec. 1-3, Mon. and Wed.; Sec. 4-6, Tu. and Th.
3. Advanced Mechanical Drawing.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Machinery Drawing.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
5. Patent Office Drawing....	" " Tuesdays and Thursdays.
6 and 7. Cabinet and Pattern Making.....	3 terms—Tuesdays and Thursdays.
8. Foundry Practice.....	" " Tuesdays and Thursdays.
9 and 10. Machine Tool Work.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
11 and 12. Gear Cutting, Tool and Die Making...	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.

II. ENGINEERING.

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. and W., 6-8 or 7-9 or 8-10.
4. Electrical Laboratory, Electrical Instruments. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4a. Steam Laboratory, Heat and Work. Tu. and Th., 7.30-9.30.	5a. Steam Laboratory, Boiler and Pump. Tu. and Th., 7.30-9.30.	6a. Steam Laboratory, Steam Engine. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. Tu. and Th., 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. Tu. and Th., 7.30-9.30.
10. Structural Steel Work.....	3 terms—Mondays and Wednesdays.	

III. MATHEMATICS.

1. Arithmetic.....	3 terms—Tuesdays and Thursdays.
2. Accounting and Penmanship.....	" " Tuesdays and Thursdays.
3 and 5. Algebra.....	3 terms—Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Geometry.....	" " Mondays and Wednesdays.
6 and 7. Trigonometry and Analytics.....	" " Tuesdays and Thursdays.
8. Engineering Mathematics First year—	Spring term, Tuesdays.
9. Engineering Mathematics Second year—	3 terms, Wednesdays or Thursdays.
10. Engineering Mathematics Third year—	3 terms, Mondays.

IV. CHEMISTRY.

1. Practical Chemistry.....	3 terms—Tuesdays and Thursdays.
2 and 3. Qualitative and Quantitative Analysis....	" " Tuesdays and Thursdays.

V. DOMESTIC ECONOMY.

1. Cookery.....	Autumn and Winter } Sec. 1, Mondays and Wednesdays.
2. Sewing and Millinery.....	Sec. 2, Tuesdays and Thursdays.
	3 terms—Tuesdays and Thursdays.

VI. ENGLISH.

1. Elementary.....	3 terms—Tuesdays and Thursdays.
2 and 3. Intermediate and Advanced...	" " Int., Tu. and Th., Adv., Mon. and Wed.

VII. UNIVERSITY EXTENSION LECTURES.

Four Courses of Six Lectures each.....	Thursday evenings, October 3 to March 26.
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Description of Evening Courses.

Mechanic Arts.

1. **MACHINE SKETCHING.** A practical course aiming to assist students in making neat projective and perspective sketches of machine parts. Special attention given to making the sketches complete as regards dimensions, finish marks, and all necessary information with the fewest possible lines and in the shortest time.

2. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

3. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 2 by more practice in machine details.

4. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 2 and 3 and experienced draftsmen.

5. **PATENT OFFICE DRAWING.** The making of clear and effective drawings to meet the requirements of "*Rules of Practice in the United States Patent Office.*"

6. **CABINET MAKING.** For beginners, cabinetmakers, and teachers of manual training.

7. **PATTERN MAKING.** For beginners, patternmakers, and draftsmen.

8. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.

9. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

10. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

11. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

12. **TOOL AND DIE MAKING.** Practice with the lathe, planer, shaper, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making punching, bending, and forming dies and adjusting in punch press.

Engineering.

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms.

Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to use in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY. Electrical Instrument Work.** Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY. Direct Current Generators and Motors.** Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY. Rotary Converter.** A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector.

5a. **STEAM ENGINEERING.** Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

6a. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

7. **ALTERNATING CURRENTS. Electrical Instruments and Principles.** Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. **ALTERNATING CURRENTS. Transformers and Transmission.** A study of the polyphase systems of transmission. Calculations and tests of reac-

tances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10. **STRUCTURAL STEEL WORK.** Composition and equilibrium of forces, parallel forces and center of gravity; statics of simple structures. Strength of materials; tension, compression, shear and flexure; ties, columns, beams, rivets, and pins. Structural designs; joints, simple roof truss, plate girder study of simple bridge, specifications.

Mathematics.

1. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

2. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. **PLANE GEOMETRY**, including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY**, including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permutations and combinations, and the use of four and five place tables of logarithms.

6. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

7. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

8. **ENGINEERING MATHEMATICS.** Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power.

9. **ENGINEERING MATHEMATICS.** Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

10. **ENGINEERING MATHEMATICS.** Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry.

1. **PRACTICAL CHEMISTRY.** The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

2. **QUALITATIVE ANALYSIS.** The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

3. **QUANTITATIVE ANALYSIS.** As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy.

1. **COOKERY.** Practical work in the preparation of food, with the study of the food principles and the effect of heat upon each. Invalid cookery.

2. **SEWING AND MILLINERY.** Cutting and making of shirtwaists, thin gowns, and dressing-sacks. Millinery.

English.

1. **ELEMENTARY ENGLISH:** Composition and Word Study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. **INTERMEDIATE ENGLISH:** Composition and Grammar. Corresponds to elementary English in high schools. Chief object to train the student to compose sentences correctly. Covers the parts of speech, sentence structure, idioms, punctuation, and spelling. Two or more short themes each week.

3. **ADVANCED ENGLISH:** Composition and Rhetoric. Corresponds to advanced English in high schools. Object to teach the principles of effectiveness in the use of the language and the application of these principles in theme writing. Covers whole compositions, paragraphs, sentences, and words.

University Extension Lectures.

The University Lecture Association makes the following announcements:

The Lewis Institute, corner of Robey and Madison streets, Thursday evenings, eight o'clock.

The season in the West Side Center will be inaugurated with an Open Meeting Thursday evening, September 26, at eight o'clock, on PUBLIC PARKS. Mr. B. A. Eckhart, president of the West Park Board, will preside and speak on THE WEST SIDE PARKS. Miss Jane Addams will speak on THE RELATION OF PUBLIC RECREATION AND MORALITY, and Professor Charles Zueblin will give an illustrated address on CHICAGO'S PROPOSED OUTER PARK BELT. This meeting is open to all without fee.

ENGLISH POPULAR POETRY. By William D. MacClintock, A. M., Professor of English Literature.

October 3.—The Tastes of "the People" in Matters of Art.

October 10.—The Older English Popular Poetry: Ballads.

October 17.—English Popular Poetry for Children: *Mother Goose*.

October 24.—The Poetry of Burns: Eighteenth Century Popular Movements.

October 31.—The Poetry of Riley and other American Popular Poets.

November 7.—The Poetry of Kipling.

A course of six lectures dealing with the poetry of the people — the philosophy of folk-art, the traditional rhymes and jingles, the folk-ballads, broadsides, and street-songs; and with the poets of the people.

ISRAEL AND THE EARLIER PROPHETS. By Herbert L. Willett, Ph. D., Assistant Professor of the Semitic Languages and Literatures.

November 14.—The Birth of the Nation — Moses.

November 21.—The Making of the Kingdom — Samuel.

*November 26.—Early Prophetic Ideals — Nathan and Abijah.

December 5.—The Struggle with Baalism — Elijah.

December 12.—The Dangers of National Prosperity — Amos.

December 19.—The Decline and Fall of Israel — Hosea.

This series of lectures covers the period from the birth of the nation under Moses to the fall of the northern kingdom 722 B. C. It reviews the making of the kingdom, early prophetic ideals, the struggle with Baalism, the dangers of national prosperity, and the decline and fall of Israel. The prophets whose work is studied are Moses, Samuel, Nathan and Abijah, Elijah, Amos, and Hosea. It is the purpose of the course to give a competent statement of the rise and progress of prophecy down to the close of the kingdom of Israel.

References.—Kirkpatrick, *The Doctrine of the Prophets*, pp. 1-142; Sanders and Kent, *Messages of the Earlier Prophets*; Budde, *The Religion of Israel to the Exile*, pp. 1-141; Harper, *Prophetic Element in the Old Testament*; Otley, *The Religion of Israel*, pp. 1-90; Willett, *The Prophets of Israel*, pp. 1-62.

MEN WHO MADE THE NATION: Part II. (Illustrating the period 1800-1860.)

By Edwin Erle Sparks, Ph. D., Professor of American History.

January 9.—Thomas Jefferson, the Expounder of Democracy (first political revolution).

January 16.—Henry Clay, the Father of Public Improvements (development of the West).

* The third lecture of the series will be delivered Tuesday, November 26.

January 23.—Andrew Jackson, the Man of the People (party men and methods).

January 30.—Daniel Webster, Defender of the Constitution (American law and statesmanship).

February 6.—Horace Greeley, the Reform Editor (the newspaper in American reforms).

February 13.—Abraham Lincoln, the First American (third return of political power to the people).

A course of lectures intended to trace the course of American History between 1800 and 1860 by grouping the events under men prominent at the time. Biography is made subsidiary to history by treating the men only as they are connected with the important events.

References.—Albert Bushnell Hart, *The Formation of the Union* (New York: Longmans, Green & Co., 1892); Woodrow Wilson, *Division and Reunion* (New York: Longmans, Green & Co., 1893.) "The American Statesman Series." Edited by John T. Morse. (Boston: Houghton, Mifflin & Co., 1882-97.)

SCENIC FEATURES OF NORTH AMERICA FROM THE GEOLOGICAL POINT OF VIEW.

By Wallace W. Atwood, Ph. D., Instructor in Physiography and General Geology.

February 20.—The Grand Canyon of the Colorado and Its Surroundings.

February 27.—The High Mountains of North America.

March 5.—The Glaciers of North America.

March 12.—Niagara Falls and the Great Lakes.

March 19.—In Limestone Caves.

March 26.—The Yellowstone National Park.

Illustrated with lantern slides.

This course has been arranged in the belief that an understanding of great scenic features adds to the enjoyment and appreciation of them. The natural wonders visited by thousands of tourists each year have a special value and interest to one who adds to an appreciation of their beauty an appreciation of the great lessons of science associated with them. In this course the physiographic processes involved in the history of the regions under consideration will be somewhat fully described and discussed.

The most important single volume for this course is Chamberlain and Salisbury's *Text-book on Geology*, Vol. I.

References.—Russell, *Rivers of North America*; Russell, *Mountains of North America*; Russell, *Glaciers of North America*; Shaler, *Outline of the Earth's History*.

Summer Session (1907).

July 1 to August 9.

OFFICERS OF INSTRUCTION.

GEORGE NOBLE CARMAN, A. M.
Director.

CHARLES WESLEY MANN, A. M.
Professor of History.

FRED A. ROGERS, B. S.
Assistant Professor of Physics and Electrical Engineering.

DUANE STUDLEY, B. S.
Assistant Professor of Mathematics.

BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics.

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS
Instructor in Woodwork.

CHARLES EDGAR HOYT
Instructor in Foundry Work.

EDWARD HERMAN LAY, A. B.
Instructor in Mathematics.

KATHERINE ISABEL INGERSOLL
Instructor in Sewing.

HORACE BERNARD MCCABE
Instructor in Machine Shop Work.

ALVIN OTTO GREESON, B. M. E.
Instructor in Mechanical Drawing.

ALFONSO WIRTH CAVANAUGH
Instructor in Mathematics.

HELMUT BERENS, A. B.
Instructor in German.

ALICE SETON-THOMPSON, A. B.
Instructor in English.

EDWARD OTTO HEUSE, A. B., B. S.
Instructor in Chemistry.

General Information.

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.
2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.
3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, covering the work of the last year of the grammar school and each year of the high school in English, mathematics, history, and German.

The tuition for the summer term for a course in one subject, five hours a week of class instruction, is five dollars. In laboratory, drawing, and shop work, ten hours, or a fraction thereof, count as five in determining the tuition.

In chemistry a deposit of two dollars is required to cover charges for breakage.

Preliminary Announcement for Summer of 1908

Mechanic Arts.

1. **MANUAL TRAINING.** Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. **CABINET MAKING.** A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

7. **ELEMENTARY PATTERN MAKING.** Intended for students in Engineering and teachers of Manual Training.

8. **ADVANCED PATTERN MAKING.** Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

9. **FOUNDRY WORK.** The instruction in foundry work is largely individual, the complete equipment of the shop making it possible to give such work as each student desires and needs. One may specialize in cupola and furnace work, in core making, in art bronze and brass work, or in light or heavy machinery molding. Special attention will be given to a course for teachers of manual training.

5. **INSTRUMENTAL DRAWING.** A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. **PROJECTION DRAWING.** Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. **MACHINE DRAWING.** Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing. More advanced machine design will be taught if desired.

20. **MACHINE SHOP PRACTICE.** A course embodying a study of the construction of the different machine tools with instruction in operating and keeping them in order. Practice in centering, plain, taper, and templet turning, chucking, drilling, boring, external and internal thread cutting; hand tool turning, filing and polishing. Forms of cutting tools, and instruction in grinding. Use of planer, shaper, and universal miller, and grinder; plain milling and cutting of spur and bevel gears.

Mathematics.

1a. **ARITHMETIC.** An elementary course in preparation for admission to the Institute.

1. **ELEMENTARY ALGEBRA.** Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. **ELEMENTARY ALGEBRA,** four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. **CONCRETE GEOMETRY,** one day a week.

3. **ELEMENTARY ALGEBRA,** four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. **CONCRETE GEOMETRY,** one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar polygons.

6. **PLANE GEOMETRY,** completed.

10. **ADVANCED ALGEBRA.** A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. **SOLID GEOMETRY.** Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. **COLLEGE ALGEBRA.** Permutations and combinations, limits, con-

vergency of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS.** The elements of differential and integral calculus with applications to the integrations most frequently required in engineering subjects.

Physics and Engineering.

A. **GENERAL PHYSICS.** An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

1. **ADVANCED PHYSICS.** An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

2. **ELECTRICAL ENGINEERING.** The courses in this department will be arranged to suit the individual student.

Chemistry.

All courses are designed to meet, as far as possible, the wants of each student.

A. **GENERAL CHEMISTRY.** High School course.

1. **GENERAL CHEMISTRY.** College course.

4. **QUALITATIVE ANALYSIS.**

6. **QUANTITATIVE ANALYSIS.** Analysis of foods, etc.

7. **ORGANIC CHEMISTRY.** General laboratory work.

Domestic Economy.

COOKING. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A. **SEWING.** Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

B. **SEWING.** Cutting and making of shirtwaists and wash dresses. Four hours a day.

C. **MILLINERY.** Four hours a day.

History.

1a. **UNITED STATES HISTORY.** An elementary course in preparation for admission to the Institute.

1. **GREEK HISTORY**, from the Persian wars to the death of Philip of Macedon.
2. **ROMAN HISTORY**, from the Punic wars to the death of Caesar.
3. **ENGLISH HISTORY**, from the Norman conquest to the present time.
4. **UNITED STATES HISTORY**. An advanced course with special attention to the sources and formation of the Constitution, its operation, and the history of political parties.

English.

A. READING, GRAMMAR, AND COMPOSITION. A course in elementary English in preparation for admission to the Institute.

1. **LITERATURE AND COMPOSITION.** A review of the required English of the first year.

4. **LITERATURE AND COMPOSITION.** A review of the required English of the second year.

7. **LITERATURE.** The "study-books" required for college entrance in 1907.

[No course corresponding to Course 8 (page 31) will be offered in the summer of 1908.]

9. **LITERATURE.** The "reading-books" required for college entrance in 1907.

German and Latin.

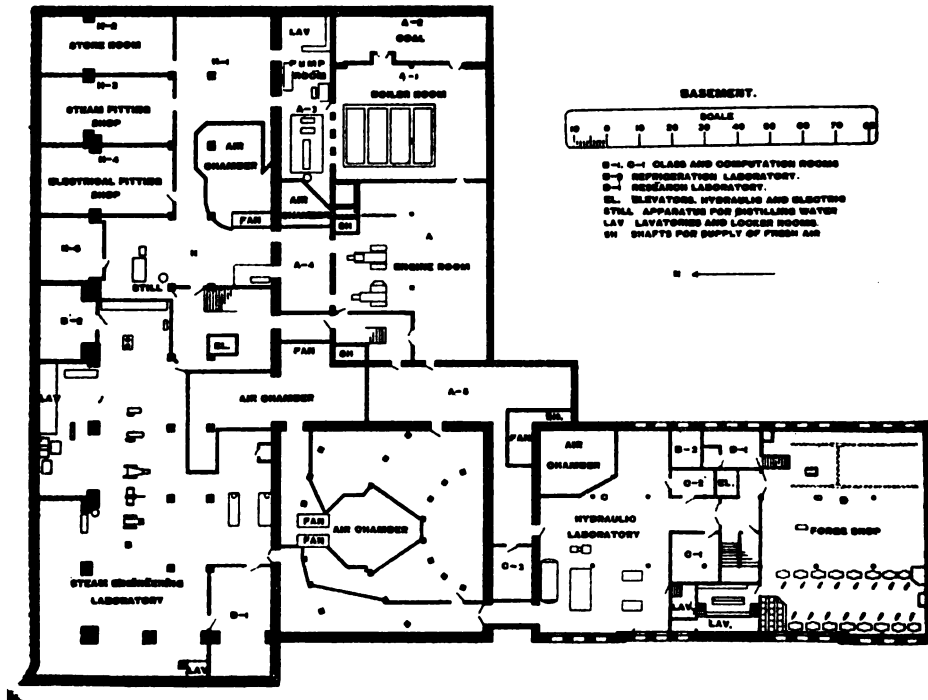
Such elementary classes as may be necessary to meet the demands of the students in attendance.

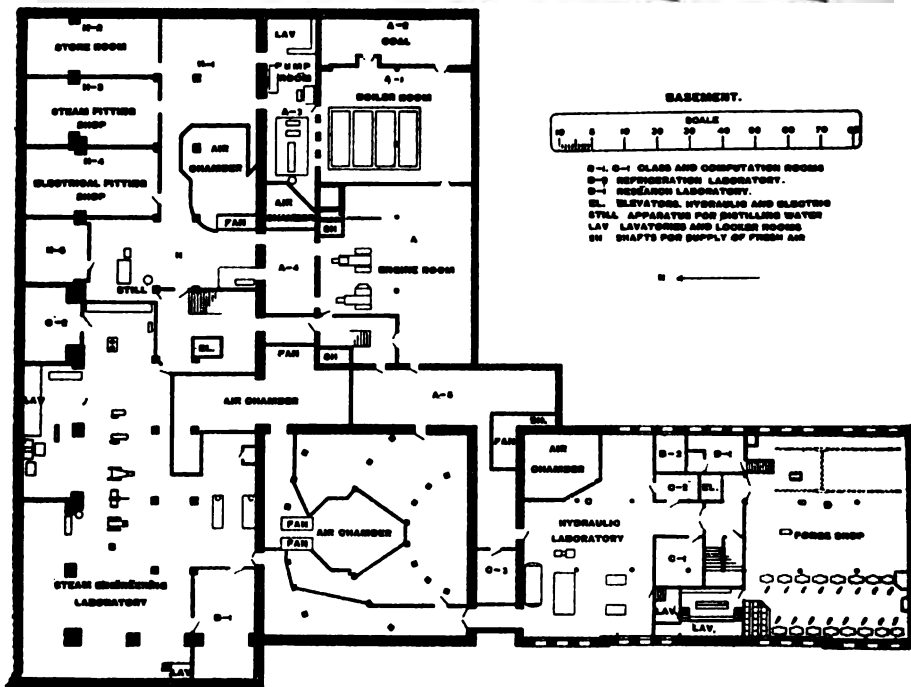
Buildings and Plans.

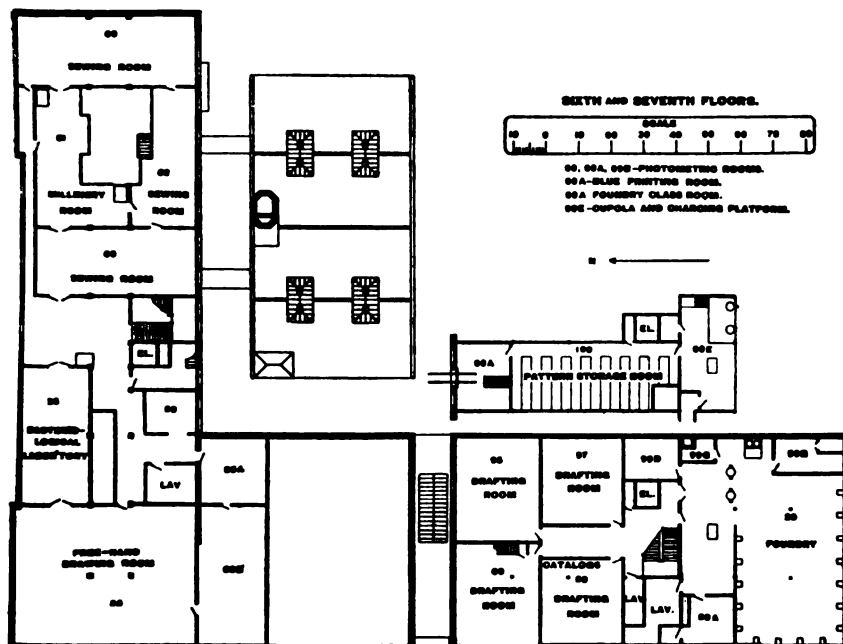
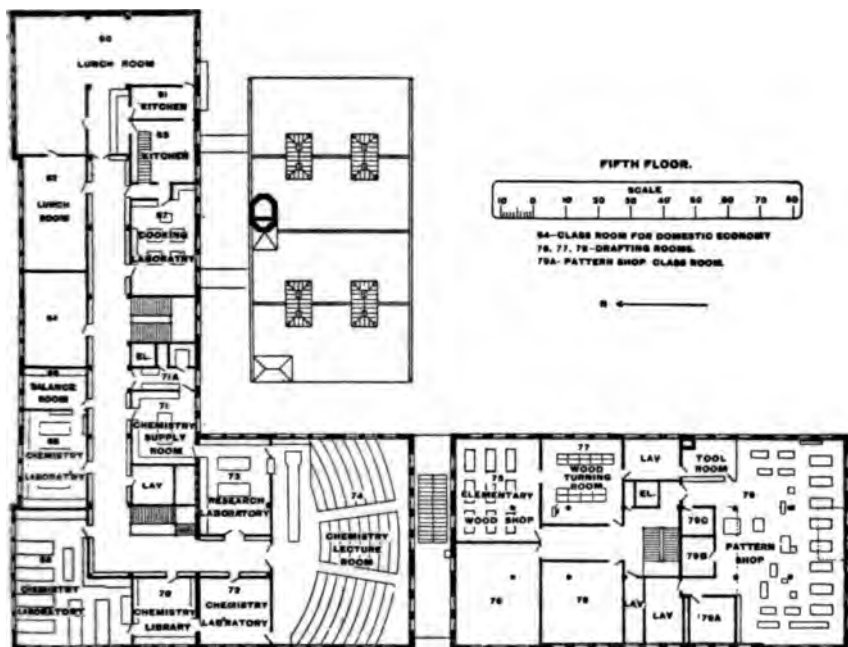
The buildings are fire-proof structures of brick, sandstone, terra-cotta, and steel, and have been erected at a cost of four hundred thousand dollars for buildings, and one hundred and fifty thousand dollars for equipment.

The Arts Building, at the corner of Madison and Robey streets, is a six-story structure; the Engineering Building, on Robey street, has seven stories; and the Gymnasium, in the rear of the other buildings, has two stories. A high, well-lighted basement occupies the entire space covered by all the buildings and the alleys which separate them.

Both the Engineering and the Arts Buildings are supplied with elevators and the most approved appliances for heating and ventilation, and are equipped with all apparatus needed for the successful accomplishment of the work that has been undertaken.







Laboratories.

The *Dynamo Laboratory* is on the third floor and covers a floor space of fifty by sixty feet. The equipment includes one 33-kilowatt direct current motor; sixteen direct current motors in sizes up to 5 horse-power; one 35-light arc dynamo; one 30-kilowatt three-phase alternator; one 5-kilowatt two-phase alternator; one 7.5-kilowatt, one 6-kilowatt, and three 5-kilowatt rotary converters, provided with switchboards so arranged that the machines can be operated as plain alternating current or direct current generators or motors, or as converters; two 2-horse-power single-phase induction motors; one 3-horse-power and two 1-horse-power three-phase squirrel-cage motors; one 5-horse-power three-phase variable speed induction motor mounted on a cradle dynamometer, and available as an induction motor, generator, or regulator, as a three-phase transformer, and as a frequency changer; one 1-horse-power variable speed three-phase induction motor; four 2.5-kilowatt transformers with connections for two-phase three-phase transformation; six 5-kilowatt transformers with a wide range of voltages; one 30,000-volt testing transformer; one constant current series arc transformer with lamps; one constant current arc regulator; a large number of indicating instruments, potential and current transformers, artificial transmission lines, motor compensators, resistances, reactances, condensers, etc.

The *Mechanical Laboratory* is located on the second floor. This laboratory is arranged for work of various kinds. In the equipment are a Reeves variable speed counter-shaft, a Thurston oil tester, a Le Chatelier and a metallic pyrometer, a 6-horse-power gas engine, a 10-kilowatt Kerr steam turbine-generator unit, an Ericsson hot air engine, and gauges, indicators, and other instruments employed in operation and test. The power of this room is supplied by a 20-horse-power electric motor hung on a cradle dynamometer.

The *Strength of Materials Laboratory* occupies one-half of the first floor of the engineering building. This laboratory is equipped to test the physical properties of steel, cement, and other materials of construction. Here are the following testing machines: A 200,000-pound Olsen, a 40,000-pound Riehle, a 1½-inch by 4-foot

Olsen torsion, a Keep dead load, a Keep impact for cast iron, and a 2,000-pound Fairbanks for cement.

The equipment for *Surveying* is kept in the Strength of Materials Laboratory. A bank of steel wire lockers contains transits, levels, sextants, compasses, barometers, and other field equipment sufficient for ten parties in surveying.

The *Hydraulic Laboratory* is located in the north end of the basement of the engineering building. It is equipped with weighing, pressure, and weir tanks, rotary and reciprocating pumps, Pelton wheel, hydraulic ram, and the necessary instruments and tools.

The *Steam Laboratory* is located in the basement of the main building. It is arranged for work in compressed air, ammonia, and steam. Included in its equipment are a 30-horse-power return flue boiler, arranged for natural or induced draft; a 7 by 12 inch Straight Line engine and two smaller experimental engines; a surface condenser; an air and ammonia compressor in connection with a half-ton refrigerating system; two large air tanks capable of withstanding 1,200 pounds pressure per square inch; several makes of steam injectors; water measuring tanks, scales, brakes, indicators, calorimeters, gauges, and other instruments employed in making tests on engines and boilers. For standardizing pressure gauges and indicator springs there is a 50-foot mercury column.

The *Department of Physics* has an especially equipped lecture room with stereopticon, hydraulic lift, pressure gauges, vacuum gauges, illuminated-dial electrical instruments, and recording hygrometer and thermometer. The lecture table is provided with water, gas, compressed air, steam, vacuum pump, and electricity.

The rooms for the use of the department are: General physics laboratory, departmental library, apparatus and preparation rooms, photometric rooms, private workroom, advanced laboratory, and electrical measurements room. In the advanced physics laboratory each table is provided with slate-lined fuse boxes, from which different currents for use in testing may be obtained. The reference library is supplied with a large assortment of books on the subjects of Physics and Electricity. The photometric room is equipped with Lummer-Brodhun and Flicker photometers, and standard lamps.

The workroom is in charge of a competent mechanic, and is equipped with a drill press, an eight-inch Rivett precision lathe with attachments for milling, grinding, and screw-cutting, a Walker grinder, and numerous hand tools.

The laboratories are fully equipped with apparatus for quantitative work in general physics and electricity. Some of the more recent additions to the outfit for work in light are the following: A Schmidt and Haensch spectrometer, a Schmidt and Haensch polariscope, a Michelson interferometer, and a Newton lecture-room polariscope.

The electrical equipment consists of standards of resistance, capacity, self-induction, and electromotive force; resistance boxes, bridges, galvanometers, and electrometers from Nalder Brothers & Co., Elliott Brothers, and Hartmann & Braun; also dynamometers, voltmeters, and ammeters of various types and ranges. A twelve-inch induction coil furnishes an important part of the equipment. Specially designed switchboards are located in the general physics laboratory and in the advanced laboratory.

The working equipment used for calibration and tests consists of modern commercial machines, such as water motors, water meters, vacuum pumps, hydraulic rams, heat motors, photometers, electric motors, voltmeters, ammeters, recording wattmeters, arc lamps, electric stoves, bridges, condensers, shunts, and discount meters.

The apparatus in the engineering laboratories is also available for use in the department of physics.

The rooms assigned to the *Department of Chemistry* occupy the west end of the fifth floor. The lecture room has a seating capacity of three hundred. The laboratories for general, qualitative, and organic chemistry are equipped with water, gas, and electric current, and contain hoods exhausted by electrically driven fans. The apparatus for the above courses is complete and modern. The quantitative and research laboratories are equipped with all the ordinary apparatus desirable for such work, including Sartorius and Becker balances. They also contain many more complicated pieces, such as combustion, assay, and bomb furnaces, Troemner assay balance, Parr's calorimeter, Junker's gas calorimeter, Brown-ing spectroscope, Bausch and Lomb microscope, Abbe refractometer, Schmidt and Haensch polariscope, thermostat, Sargent's carbon combustion apparatus, and apparatus for gas and oil analysis and for electrolytic determinations. The supply of chemicals is abundant and varied. The department library includes the best American, English, German, and French reference works and the current American and English periodicals.

The *Geographical and Geological Laboratory* equipment includes the following: A nearly complete set of the topographical atlas sheets of the United States Geological Survey; United States Coast and Geodetic Survey charts and Geological folios; Mississippi and Missouri river charts; pilot charts of the Atlantic and Pacific oceans; weather maps and charts; relief globe of the earth; relief maps of the continents; relief maps of the United States and of selected localities; collections of common rocks and minerals; several hundred lantern slides; Laing's planetarium, Morse's heliodon, and a four-inch refracting telescope; tables and facilities for molding topographical features; books of reference.

The *Biological Laboratory* has demonstration table with sink and gas supply; laboratory tables with individual lockers; thirteen compound microscopes; sixteen dissecting microscopes; the usual supply of glassware, reagents, etc.; mounted human and animal skeletons; charts; collections of preserved animal and plant specimens and dissections, of microscopic preparations, of lantern slides, of reference books.

The *Bacteriological Laboratory* is furnished with tables having water and gas supply and individual lockers with the usual apparatus; also with incubators, Arnold's sterilizer, hot-air sterilizer, other apparatus, books of reference. The same laboratory contains additional lockers and equipment for the class in household chemistry.

The *Cooking Laboratory* has individual accommodations for classes of sixteen students; a demonstrator's table; and the usual kitchen equipment for cooking and serving in larger quantities.

Shops, Drawing Rooms, Sewing Rooms, etc.

The *Elementary Woodshop* is situated at the north end of the fifth floor and is arranged to accommodate four classes of eighteen each. This shop is for hand work only. The benches are similar to those in the pattern shop, and are equipped with the necessary tools. Seats are arranged so that students can be given class instruction by practical demonstration and by lectures in which the stereopticon can be used. Special tools and supplies are kept in the tool room. The locker room is arranged with individual lockers.

The *Wood Turning Shop* is situated between the elementary wood shop and the pattern shop, and is equipped with eighteen lathes of various sizes and makes and the requisite tools and appli-

ances. The lathes are driven by a ten-horse-power motor. Lockers for the students' work are located along one side of the shop. The locker and wash room opens off the shop.

The *Pattern Shop*, on the fifth floor, is arranged to accommodate four classes of sixteen each. It is equipped with eight double benches, each side of a bench having a locker in which the tools used by the students in general are kept, and four locked drawers in which are kept the edged tools used by individual students. The machines in the pattern shop are one 24-inch 12-foot, and three 16-inch 6-foot overhanging spindle lathes; two 12-inch 5-foot, and two 11-inch 4½-foot speed lathes; one 24-inch surface planer; one universal circular cut off and rip saw; one 36-inch band saw; one grindstone; one emery tool grinder; one trimmer, and one sand-papering machine. The band and circular saws and the planer are driven by individual electric motors. The lathes are driven from two line shafts, each of which has an independent motor.

Special tools and supplies are kept in the tool room, and tools are issued to students on check. Conveniently located are a dry kiln and a room in which unfinished work is kept. An office and class-room open off the shop.

The *Advanced and Elementary Machine Shops* are on the fourth floor and occupy two separate rooms. The shop at the north end of the building is for elementary machine work, and the south shop is for advanced work. Between the two shops and communicating with both is the tool and stock room, where all small tools and supplies are kept.

The equipment of the *Elementary Machine Shop* consists of one 12-inch 5-foot plain engine lathe; one 12-inch 5-foot engine lathe with draw chucks, taper attachment, and compound rest; three 14-inch 6-foot and one 15-inch 6-foot engine lathes, with taper attachments and compound rests; seven 14-inch 6-foot plain engine lathes; two 12-inch 4-foot speed lathes; one 15-inch friction geared shaper; one 16-inch crank shaper; one No. 1½ Universal miller; one 18-inch drill press; one double-wet emery tool grinder; and sixteen vises, placed on a bench running along two sides of the shop. Near the entrance stands a case of small lockers in which the students keep their work and individual tools. The machines in this room are driven by a ten-horse-power electric motor attached to the ceiling.

The *Advanced Machine Shop* is equipped with one 18-inch 12-foot engine lathe, with compound rest; one 16-inch 8-foot, and one

15-inch 6-foot engine lathe, with taper attachments; one 16-inch 8-foot engine lathe, with taper attachment and compound rest; one 14-inch 6-foot toolmakers' lathe, with taper and backing off attachments, compound rest, and draw chucks; one 12-inch 4-foot speed lathe; one No. 3 back geared screw machine, with wire feed; one No. 2 universal miller, with slotting and rack cutting attachments; one No. 3 universal miller, with universal vertical and circular attachments; one 12-inch by 30-inch universal grinder; one 26-inch rack shaper; one 24-inch by 24-inch by 6-foot planer; one 24-inch back-geared drill press; one 13-inch sensitive drill press; one No. 3 inclinable punching press; one combination emery wheel and disc grinder; one wet emery tool grinder; one universal cutter grinder; one circular metal cut-off saw; eight vises placed on wood benches along the walls on two sides of the shop, and three vises on iron benches on the erecting floor and among the machines. All the machines in this shop are driven by independent direct current electric motors, so connected as to give the necessary variations in speed. A one-ton 16-foot hand-power traveling crane, mounted in the center of the shop so that it can traverse the whole width of the building, provides for the handling of heavy work and parts of the machines and tools. In the tool room are kept the general tools and cutter holders belonging to the machines, all the small tools, scales, standard gauges, measuring instruments, supplies, and general stock used in the work of the shops. The tool room is in charge of an attendant, who, by means of the check system, issues tools to students as they are needed in the work. A class room and office open off the shop.

The *Forge Shop*, in the basement of the engineering building, is well lighted by windows on three sides. The equipment consists of one large forge for steam hammer work; one gas tempering forge; one brazing forge; one 200-pound steam hammer; one angle bender; one eye bender; one bolt header; anvils, forges, and tools for a class of sixteen in ordinary forge work. A 12-foot hand-power traveling crane handles large work for the steam hammer, large forge, and heating furnace. The smoke from the forges is taken away through down draft hoods by a 60-inch steel exhaust fan, and the blast is supplied by a 24-inch blower, both of which are driven by a 15-horse-power motor. A post drill, a double emery grinder, and a power hack-saw are driven from a separate motor. A stock room and a class room open off the shop.

The *Foundry*, on the sixth floor of the engineering building, is well lighted from skylights in the roof and by windows in the side and end.

The molding floor is made of cedar block placed on end; the floor around the cupola and furnaces is of brick. There are places for sixteen students, each place having a molding floor and a bench, and each bench an equipment of shovel, riddles, rammers, bellows, and molders' small tools.

There is a well equipped core room with two core ovens, one heated by gas for small cores, and the other, 6 feet wide by 10 feet long by 7 feet high, heated by coke and equipped with a car 4 feet wide by 6 feet long. A track for the car runs under the crane for handling large cores and dry-sand molds. There are two permanent and two portable brass furnaces with a combined capacity of 800 pounds, and two cupolas, one a 16-inch, hung on trunnions, and the other, a 24-inch, standing on the floor. A one-ton 16-foot traveling crane with electric hoist covers the main floor of the foundry. The equipment includes a cleaning room with tumbling barrel, and a flask and pattern shop with 12-inch wood lathe. The machinery is driven by a 5-horse-power motor.

A class-room and office open off the foundry. A pattern storage room 20 feet by 60 feet opens off the charging platform. All the equipment with the exception of motors and fan was built in the Institute shops.

The *Rooms for Drawing and Design* are in the engineering building, four on the sixth floor, two on the fifth floor, and one on the fourth floor. They aggregate about five thousand square feet of floor space and are amply lighted and furnished. Their proximity to the foundry, pattern, and machine shops makes it possible to co-ordinate, to an unusual degree, the design and the constructive branches.

The blue-print room is on the mezzanine floor above the sixth, and is approached through a drawing room on the sixth floor. It is equipped with a 40 by 52 inch curved glass blue-print machine, tracing files and blue-print baths.

On the sixth floor of the Arts Building are ample accommodations with overhead light for the work in freehand drawing.

The *Sewing Rooms* are four in number, situated on the sixth floor of the Arts Building, with overhead light. The largest room has accommodations for sixty students. The machine room is

supplied with ten sewing machines, electric iron, and mirrors and screens for fitting. The millinery room accommodates twenty students, and is furnished with show-cases, models, etc. One of the sewing rooms contains a loom, a spinning wheel, and other apparatus provided for the work in textiles.

Lunch Rooms. There are three lunch rooms. Two of these are on the fifth floor of the Arts Building, adjoining the Cooking Laboratories. Lunch is prepared under the direction of the instructors in cooking, and is served at very reasonable charges. A large room is reserved on the first floor of the engineering building for such men as choose to bring their lunch. In this room only milk, chocolate, and broth can be bought.

Libraries.

The main library consists of about fourteen thousand volumes, and about two thousand pamphlets, selected with immediate reference to the needs of each department. It is essentially a working library, containing all necessary reference works, together with representative books in the various sections of history, biography, literature, fine arts, engineering, mathematics, philosophy, philology, and sociology. There are special libraries connected with the class-rooms in physics and chemistry. One hundred and sixty-three periodicals are currently received.

Throughout the school year the libraries are open from eight A. M. to five P. M.; during the session of the night school the hour for closing is nine P. M. The students at all times have free access to the shelves. Library assistants serve in turn at the reference desk and assist in making the students familiar with the arrangement of the books and the use of the dictionary catalogue. The catalogue is a clear, simple guide to the resources of the library, free from confusing technicalities. The Dewey system of classification is used, with Cutter book numbers.

Students in Attendance, 1906-1907.

The names of students taking evening or summer courses are not included in these lists.

College Students.

The figures after the names indicate the number of courses of instruction completed without conditions at the close of the year ending in June, 1907, above and beyond the fifteen admission units.

Engineering College Students.

Adams, Charles Webster.....	23	Havens, Fred.....	23
Adams, Clyde.....	10	Havlik, Robert Frank.....	36
Allan, William Selby.....	6	Heath, William Clarkson.....	6
Allen, Frank Lee.....	36	Hoadley, George Lee.....	6
Arp, Clarence.....	17	Hodges, Albert.....	8
Attley, Emmett George.....	8	Huenkemeier, Earl.....	7
Badger, Arthur Hewitt.....	14	Huge, Wilfred John.....	18
Badger, Henry Stillman.....	13	Hunter, Vincent John.....	45
Bang, Homer William.....	13	Jacobi, Will Olando.....	12
Bassett, Cyrus White.....	6	Jensen, George.....	10
Bergmann, Ernest.....	21	Johnson, Forbes.....	6
Bloss, Eugene.....	8	Jordan, Irving.....	18
Borg, Charles.....	36	Kaindl, Arthur.....	18
Brand, Paul.....	4	Kane, Joseph.....	36
Brickwood, Blaine Jackson.....	8	Kidder, Walter.....	12
Buechner, William.....	17	Kilner, Harold.....	12
Bush, George Chester.....	2	Kilner, Ralph Hammond.....	20
Byron, Frank.....	7	Kletsing, Raymond Henry.....	
Carlson, George.....	7	Koelling, Adolph, Jr.....	10
Carpenter, Charles Irving.....	15	Kohout, Jerome Francis.....	10
Cass, Lee.....	8	Kolkow, Charles von.....	36
Cohn, David.....	26	Kuehne, Alfred.....	18
Connelly, Martin Francis.....	4	Lane, Frank Grove.....	8
Curtis, Arthur John Ramage.....	10	Levinson, Lazarus.....	6
Davenport, Earl.....	5	Libberton, Jesse Herbert.....	27
Degraw, Orley Andrew.....	7	Libbey, Herbert.....	27
Dempsey, Ewald.....		Loeding, George.....	6
Dieckman, Albert.....	27	Long, Arthur Morris.....	6
Dohnal, Ignas.....	2	Martin, Edward Paul.....	18
Duclos, Aeneas.....	14	May, Arthur Edward.....	6
Etnyre, George Mortimer.....		McChesney, John Sherman.....	9
Filkins, Earl.....	14	McDaniels, Frank Leslie.....	24
Fittsimmons, James.....	36	Mettenet, Francis Xavier.....	3
Ford, Albert Phillips.....		Moffett, Frank.....	12
Gilbert, Harry Nathaniel.....	36	Moore, Roy Stehman.....	18
Goss, Le Roy.....	14	Morgan, Edward.....	27
Haber, Michael Joseph.....	36	Muench, George William.....	30
Hall, Arthur Gillespie.....	18	Nicholl, Ellis Hudleston.....	6
Hall, John.....	24	Nowak, Carl Alfred.....	6
Harris, Charles.....	6	Pardey, Gilbert Rea.....	9
Harvey, Arthur Homer.....	10	Parker, Vilas.....	9
Hauber, Clemens.....	6	Perlow, Arthur Raymond.....	12

STUDENTS IN ATTENDANCE.

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Peterson, Harvey Emanuel.....	6	Strauss, Walter Conrad.....	36
Pusey, William.....	24	Sullivan, William Tyrrell.....	36
Rafferty, James.....	27	Summerhays, Elmer Moore.....	24
Riddell, Murray.....	6	Sykes, Grover.....	27
Robinson, Pratt.....		Thatcher, George William.....	
Schmidt, Carl Henry.....		Thompson, Roy.....	24
Schweiger, Edwin.....	15	Tull, Mark Eugene.....	6
Shalek, Raymond Francis.....		Tuohy, Arthur Cavanaugh.....	6
Sharp, Augustus William, Jr.....	8	Uhlhorn, Walter.....	12
Sherman, Oren Gray.....	18	Van Tassel, Claude Lansing.....	
Sherman, Victor.....	12	Walker, Fred Gale.....	
Shewmon, Dan Dimmitt.....	6	Wallace, John Dwyer.....	12
Siebel, Emil.....	24	Whitehead, Richard Henry.....	26
Skooglund, David.....	27	Wig, Rudolph James.....	36
Smail, Elmer Stiles.....	4	Wolf, William John.....	24
Smith, Edward.....	27	Zielaskowski, John.....	15
Stone, Porter Edwards.....	30		

Science and Arts College Students.

Ancona, Catharine Adelaide.....	9	Gansbergen, Marguerite Elizabeth	6
Anderson, Agnes.....	18	Gaynor, Kathleen Marie.....	3
Backus, Edwin Burdette.....	18	Gill, Nelle.....	21
Batchelder, Edith Pottle.....	9	Goodman, May Isabelle.....	3
Batdorf, John Luther.....	9	Grant, Helen Seger.....	18
Bergmann, Adele.....	18	Gunthorp, Martha Jane.....	42
Beverley, William Nelson.....	20	Hayes, Daniel Francis.....	14
Bishop, Jessie.....	2	Heinz, Alice Margaret.....	9
Brickwood, Beatrice Marguerite.....	18	Hill, Laura Wescott.....	18
Brosseau, Joseph.....	2	Holden, Grace.....	12
Burkhart, Stella.....	9	Holmes, Carolyn Butterick.....	6
Bruckner, Eugene.....	3	Hood, Grace Gordon.....	18
Butcher, Fannie Amanda.....	6	Howe, Marjorie.....	10
Campbell, Ada Estelle.....	9	Hubbell, Irene.....	9
Carnes, Portia.....	24	Johnson, Antonia.....	9
Cassell, George Frederick.....	24	Kammerling, Edith.....	9
Clark, Martha.....	27	Keeler, Anna Estelle.....	6
Coonley, Edith Gertrude.....	9	Kendrick, Agnes.....	27
Corkell, Delphine Zarilda.....	9	Kennard, Elva Martha.....	6
Corkell, Paul Paschal Cevera.....	13	Kerner, Robert Joseph.....	27
Costello, Eunice.....	27	Kerr, Edith (Mrs.).....	18
Cota, Bernice Elizabeth.....	3	Kilner, Mercedes.....	20
Coulter, Gertrude.....	18	King, George Russell.....	18
Crisler, Ethel Fern.....	3	Kohtz, Elsa.....	4
Cunniff, May.....	27	Kubitz, Edna Adelaide.....	9
Cunningham, Martha Isabella.....	9	La Due, Ethel Irene.....	9
Dick, Rhoda Ellen.....	9	Levin, Isadore.....	4
Dicker, Alfred Desmond.....	6	Lighter, Samuel.....	7
Dolan, Vera Jessica.....	6	Lothe, Ada Belinda.....	18
Dresch, William.....	6	Lyons, Maud May.....	9
Eismann, Louise.....	27	MacMillan, James Hanna.....	4
Epler, Nelle.....	6	Martin, Amy Marguerite.....	18
Esch, Irmgard Anna.....	6	Mather, Jennie.....	18
Evans, Josephine Sherman.....	18	Mauritzon, Elsie Elizabeth.....	15
Fainer, Emanuel.....	7	McCarthy, Lillian Agnes.....	9
Falls, Mildred.....	9	McKinley, Martha Barat.....	18
Farrell, Grace Leone.....	4	Medwedeff, Sophia.....	
Fitzgerald, Flora Ellen.....	3	Melaas, Gaea Eleonore.....	11
French, Henrietta.....	18	Melendy, Emma Lucretia.....	12
Fuller, Mabel Clare.....	6	Middleton, Dale.....	

Colburn, Jewett Adelbert.....	8	Freilich, Ellis Benjamin.....	11
Collier, Helen Beatrice.....	7	Fuchs, Marguerite Elisa.....	4
Conlon, Leo Lawrence.....	6	Fuermann, Mabel Henrietta.....	5
Converse, Joseph Oliver.....	7	Furst, Edith Emily.....	6
Coonley, George Theron.....	4	Furst, George Fredrick.....	15
Corliss, John Lester.....	4	Furst, Gertrude Lydia.....	3
Corrigan, Arthur James.....	2	Gair, William Henry.....	4
Corrin, Richard.....	9	Gamble, Celia Martin.....	7
Cravens, Worth Townsend.....	4	Gamble, Merritt Campbell.....	3
Crawford, Russell Nelson.....	8	Garcia, Juan.....	7
Cregar, Arthur Austin.....	4	Gault, Meta Caroline.....	9
Crile, Dennis Rider Wood.....	8	Gerstenberg, Amy Aurelia.....	15
Cull, Ellen Elisabeth.....	3	Gillette, Harold Loomis.....	12
Curtiss, Rex Charles.....	9	Gillmore, Ruth Marjorie.....	3
Dabbert, George.....	3	Gleeson, Frank Thomas.....	8
Dahl, Arthur Clarence.....	4	Glidden, Benjamin Wilmarth.....	3
Dale, David.....	6	Glos, Albert Henry.....	15
Davey, Doris Alice.....	12	Godwin, Robert Franklin.....	15
Davidson, Isabelle.....	7	Goldsmith, Roy Douglas.....	15
Davies, Glenn Harrison.....	5	Goddard, Joy.....	10
Davis, Joseph Olmsted.....	9	Godfriaux, Lewis Edward.....	12
Davis, Paul Newhall.....	3	Goehrs, Irving August.....	4
De Bey, Marie.....	4	Goit, Alexander Clinton.....	7
De Jong, Carroll Stone.....	6	Goit, Lawrence Edward.....	4
Dennis, William Clark.....	6	Golden, Walter.....	12
De Schippen, John.....	4	Gordon, Hallie Caroline.....	6
Dickson, Cyril Bernard.....	6	Gould, Joseph William.....	4
Dodge, Raymond.....	7	Graue, Fremont D.....	10
Doetsch, Oscar Philip.....	4	Gray, Alice Gertrude.....	15
Doheny, Harold James.....	4	Graydon, Ruth Anna.....	4
Doktorsky, Philip.....	7	Greene, Alvin Childs.....	3
Dugan, Nellie.....	10	Gruenfeld, Julius.....	7
Dunn, Fred David.....	9	Hagemann, Ernest.....	8
Dux, Waldo.....	13	Hagstrom, Harry Oscar.....	8
Dwire, Junius Homer.....	13	Haines, Grace.....	15
Dyson, George Egbert, Jr.....	3	Haines, Earl Moulton.....	14
Eckles, Noble.....	6	Haines, Thomas Lloyd.....	11
Edstrom, Edward.....	6	Hansen, Edward Harry.....	8
Ehrat, Anna.....	9	Hansen, Henry Nicolas.....	9
Ehrhardt, Alwin William.....	6	Hansen, James Berger.....	4
Einfeldt, Clara.....	7	Hansen, Merritt Rasmus.....	8
Eldred, Warren.....	10	Hapeman, Clark Mac.....	4
Eldredge, William Strickland.....	6	Hardy, Maurice.....	3
Ellicott, Frederic Boyer.....	2	Harris, Nancy.....	10
Enger, Dorothy Hellen.....	7	Haskins, Dorothy Margaret.....	8
Esch, Ingo August.....	5	Hathaway, Mary Cecilia.....	3
Evarts, Roy Holden.....	6	Havens, Katherine.....	8
Faherty, Edward.....	2	Haynie, Wilbur Rucker.....	15
Falls, Hazel.....	15	Healey, Claude Sprague.....	11
Feeley, Frank.....	13	Hedman, Herbert.....	9
Fehlman, Martin Stempel.....	3	Heffron, Arthur.....	9
Filip, Ignac Stanialaus.....	10	Heffron, Helen.....	4
Findeisen, Charles Walter.....	3	Hepp, Emil.....	3
Falanagan, Arthur Joseph.....	4	Herrick, Helen Powers.....	7
Flanders, Paul Aikin.....	10	Herrman, Leon Charles.....	3
Foley, Alexander.....	7	Hess, Carleton White.....	8
Forster, Ilse.....	15	Hewett, Edith Adelia.....	14
Fox, Russell.....	7	Hildebrandt, George.....	10
Frank, Maurice.....	6	Hill, Frederick Alfred, Jr.....	11
Fransen, Hulda.....	4	Hill, John.....	7
Frasier, Charles Mark.....	12	Hochstadter, Benjamin.....	4

STUDENTS IN ATTENDANCE.

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Hoffer, John George.....	9	Kohler, Alma Sophie.....	4
Hoffman, Clara Louise.....	10	Kokes, Joseph.....	11
Hoffman, Robert Charles.....	2	Kool, Vera Mae.....	4
Hofrichter, Joseph.....	15	Koop, Marguerite Emily.....	4
Holden, Katherine Marion.....	10	Korup, Dora.....	4
Hood, Clara Louise.....	10	Kosche, Irving Oscar.....	8
Hooper, Mildred.....	12	Kramer, Frank Joseph.....	6
Horder, Ivy Louise.....	9	Kratsenstein, Louis.....	6
Hotchkiss, Allita Frances.....	3	Kroeschell, Carl Herman.....	10
Hunter, Dundas.....	12	Kuehn, Erma.....	5
Hussagh, Victor Lee.....	11	Kuester, George Carl.....	2
Ilett, Dorothy.....	4	Labahn, Charles John.....	4
Ilett, Marie.....	8	Lamoreaux, Rene.....	7
Ingold, Arthur.....	6	Lamoreaux, Rose.....	8
Irvin, Isabel.....	15	Lampert, Henry Herman.....	10
Jacobs, Helen Catherine.....	8	Lane, James Warren.....	4
Jacobsen, Inger Amala.....	12	Lange, Nellie Torrent.....	3
Jacobsen, Jennie Charlotte.....	12	Langworthy, Rose Steinbrecher.....	15
Jacobsen, Norman.....	8	Larsen, Elmer Carl.....	9
Jandus, Robert Cyril.....	6	Larsen, Reginald Lester.....	6
Jenkins, Ralph Mathers.....	8	Larsen, Ruth Eleanor.....	3
Jensen, Edward.....	5	Lay, Landon Sebastian.....	4
Jensen, Katharine.....	15	Layman, Kenneth Foss.....	6
Jensen, Kay Ina.....	3	Le Brock, Glen Roy.....	7
Jessup, Carl Justis.....	3	Lehle, William Louis.....	9
Johnson, George Alvin.....	8	Lehmkuhl, Paul August.....	2
Johnson, Arthur Clarence.....	4	Leininger, Luther.....	2
Johnson, Carl.....	2	Leman, Edwin.....	15
Johnson, Charles Hughes.....	3	Liddy, Leslie William.....	4
Johnson, Carl Edward.....	5	Lindquist, Elmer Washburn.....	7
Johnson, Ethel.....	3	Lively, John Cornelius.....	3
Johnson, Louis Ely.....	2	Loch, Floyd Wesley.....	10
Johnson, Marshall Chase.....	9	Loeding, Sophia.....	10
Johnson, Robert Ulyases.....	7	Loff, Roy Elmer.....	11
Johnston, Arthur.....	15	Longley, Clifford Boles.....	15
Jones, Ethel Grace.....	11	Lorensen, William.....	11
Jones, Irene Jennie.....	6	Loring, Elsie Brown.....	9
Jones, Warren Gilman.....	5	Loudon, William Hodge.....	6
Kasda, Charles Bohumel.....	12	Lovell, Harold Messer.....	2
Keir, Clarence.....	9	Lovett, Raymond Henry.....	3
Keirnan, Marie Josephine.....	15	Ludwig, Pearl Ethel.....	3
Kelder, Julius Herman.....	4	Luhnnow, Walter Frederick.....	3
Kelley, William James.....	4	Macaraig, Juan.....	11
Kelly, John.....	10	MacKinlay, Thomas Sherwood.....	15
Kemnitz, Arthur.....	13	MacLeod, Norman Langley.....	15
Kenney, John.....	15	Magerstadt, Edmund William.....	5
Kester, Lawrence.....	12	Magnus, Albert, Jr.....	5
Kietzer, Waldemar Weimar.....	11	Major, Roscoe.....	9
Kimball, Arthur.....	12	Mann, Edwin Judson.....	5
King, Albert Vincent.....	3	Mann, Marjorie Ridpath.....	4
King, Robert Winfield.....	7	Markowits, Morris.....	4
Kirby, Frank Irving.....	7	Maronde, Arthur Rheinhold.....	4
Kirkland, Curtis Hobart.....	15	Marr, John Arthur.....	3
Kissinger, Alexander.....	15	Martin, Gail Ellsworth.....	15
Kistenbroker, Irma Henrietta.....	4	Martin, Robert Sackett.....	4
Klamt, Edward.....	12	Marx, August.....	11
Klein, William Frederick.....	15	Masters, Harry.....	12
Kniffen, Chester Warren.....	11	May, Irma.....	3
Knoch, Marie Johanna.....	4	McCarthy, Anna Elizabeth.....	6
Knoll, Robert.....	9	McCarthy, Lillian Agnes.....	4
Knox, Florence.....	5	McDonnell, Grace Dorothy.....	15

McGuire, Agnes.....	9	Peake, Frederick Burbank.....	6
McGuire, Desmond.....	12	Pearse, Mabel Katherine.....	7
McKee, Eustis Ewart.....	6	Perrill, Alger.....	7
McMahon, James Alan.....	5	Perrill, Rodney.....	15
McMaster, Ruth Marie.....	7	Peterson, Theodore Waldemar.....	8
McMullan, William.....	12	Peterson, Albert.....	2
McNeill, Thomas Henry.....	5	Peterson, Francis Edgar Walford.....	4
Mendelsohn, Clarence.....	3	Peterson, Fred Ronald.....	9
Menzel, Emma Selma.....	3	Peterson, Harold.....	11
Menzel, Henrietta Caroline.....	7	Peterson, Robert William.....	2
Mercy, Annie.....	3	Petrie, William Bradish.....	5
Merriell, George Hughes.....	12	Phimister, Orrin Potter.....	3
Merriell, Lyle Luce.....	9	Pierce, Cornelia.....	12
Merrill, Ralph Whelan.....	11	Pierce, Irving Harry.....	5
Messier, Valois Elwyn.....	4	Pihlfeldt, Bergliot Edna.....	8
Mey, Victor, Jr.....	3	Pilat, Robert.....	11
Meyer, Walter.....	12	Pincoffs, Edmund.....	9
Midgley, Edith Luella.....	15	Pond, Frank Hayward, Jr.....	15
Miller, Lorraine.....	9	Porter, Edwin Margraff.....	3
Millholland, Ernest.....	8	Potter, Mary Kathryn.....	15
Moeller, John Fred.....	4	Powers, William Francis.....	8
Moody, Helen Rose.....	7	Preston, William Douglass.....	4
Moody, Marie Agnes.....	15	Price, William Henry.....	6
Moore, Hazel Alice.....	6	Prindiville, Louis Ashfield.....	3
Morse, Wesley Carpenter.....	10	Puster, Dumas Eugene.....	10
Mosher, Raymond Landis.....	7	Puster, John Harold.....	10
Moste, Maurice.....	12	Puster, Margaret Emrich.....	4
Mott, Edgar Clayton.....	5	Raithel, Andrew George.....	4
Moulton, Henry Harper.....	4	Rathbun, Irene Louise.....	6
Moulton, Herbert Lewis.....	7	Raymer, Abigail.....	15
Mueller, Maud Emily.....	3	Rawleigh, James Nester.....	6
Murdock, Winifred.....	10	Raymer, Alice.....	10
Murphy, Kenneth Wayne.....	9	Rayner, Joseph.....	6
Nagl, Marie.....	13	Rayspis, James Thomas.....	7
Nason, Elsie Lillian.....	2	Reger, John.....	11
Nath, Kathryn.....	4	Reichel, Albert Sunderlin.....	3
Nelson, Arthur Randolph.....	10	Reinhardt, Charles Henry.....	3
Nelson, George Howell.....	2	Reininga, Henry.....	11
Nelson, Marie Josephine.....	8	Reisenhus, James Arthur.....	12
Nelson, William David.....	15	Renschler, Evalynne.....	9
Newell, Frank Samuel.....	15	Rhodes, Margaret.....	4
Newhall, Arthur Weber.....	7	Rich, Herbert Todd.....	8
Newton, Harold Jackson.....	10	Richardson, Arthur Julian.....	6
Newton, Irene.....	15	Richter, William Henry Charles.....	7
Nichols, George Roseman.....	15	Robertson, George Percival.....	11
Nicholson, Ralph Alexander.....	15	Robinson, Gordon.....	3
Nickelson, Robert Theodore.....	14	Robinson, John Laurence.....	11
Nieman, Byron Weasa.....	4	Robinson, Lucy Ellen.....	3
Norman, Carl Clarence.....	7	Robinson, Myra.....	12
O'Brien, George Francis.....	3	Rodgers, Elmer.....	4
O'Brien, Janet.....	11	Rogers, Frank Ely.....	8
O'Brien, Ruth Catherine.....	4	Rohde, George Carl.....	4
Ogden, David Batchelder.....	3	Rojahn, Edna Alberta.....	6
Olds, Grover Edwin.....	3	Rose, Harold Emanuel.....	4
O'Mara, Jefferson Tom.....	11	Rose, Waldo John Albert.....	8
Palamaris, Constantine.....	9	Rosseland, Frederick Martin.....	6
Pardee, Theron.....	15	Rossiter, Laura Weaver.....	3
Parkhurst, Perry Claude.....	6	Roth, Walter Sherman.....	3
Parks, Clarence Runyan.....	8	Royer, Harry.....	4
Paadeloup, Frank Louis.....	5	Rubenstein, Joseph.....	6
Patrick, Harry Evans.....	4	Rudolph, Lewis.....	15

Ruettiman, Emma Mario.....	3	Tischer, Arthur Herman.....	15
Russell, Emerson.....	11	Titus, Harold Earl.....	8
Russell, John Kent.....	7	Toban, Frank.....	6
Rutherford, John Joseph.....	4	Tope, William Arthur, Jr.....	2
Ryan, James.....	12	Torgerson, Edward Fritchoff.....	8
Ryther, Henry White.....	6	Travis, Lawrence Le Valley.....	8
Sailor, Helen.....	9	Troyke, Alfred.....	12
Salisbury, Howard Darius.....	8	Troyke, Louis.....	6
Samels, Edgar.....	10	Tuohy, Paul.....	4
Sands, John.....	12	Turnbull, Florence.....	15
Sauer, Joseph.....	3	Turner, Charles Arthur.....	4
Saxe, Edward Goodwin.....	5	Tylor, Charles.....	9
Saxon, James Christian.....	6	Ullrick, Helen May.....	12
Schaedel, Victor Emil.....	9	Vavrinek, Edward Joseph.....	4
Scheuer, Walter.....	7	Verkoulén, Frank Hubert.....	3
Schlosser, Paul Chelsie.....	4	Vivian, Glenn Fish.....	6
Schmidt, Bertha.....	7	Vockel, Clarence.....	8
Schmidt, Nell May.....	4	Vogt, Joseph.....	8
Schofield, Mary.....	15	Volberding, Harry Henry.....	4
Scholbe, Ralph Frederick.....	4	Volk, Carl.....	15
Schrader, John Herman.....	4	Voss, Fred.....	10
Schroer, Elsa Augusta.....	4	Voss, James Peter.....	5
Schultz, Esleigh Ernest.....	8	Voss, Louis.....	5
Schwartz, Albert Abraham.....	2	Vrana, Olga.....	3
Schwartz, Samuel.....	4	Wagenknight, Oscar Pearl.....	2
Scott, Charles Edward.....	6	Wagner, Elsbeth Beatrice.....	6
Seyferlich, Edgar Philip.....	15	Wahl, Arnold Spencer.....	8
Shaver, Ernestine.....	12	Wahl, Richard Webster.....	7
Sheardown, Rex Winton.....	8	Wallace, William Alfred, Jr.....	7
Shotwell, Leonard.....	12	Walther, Charles Brock.....	3
Simons, Erskine Phelps.....	7	Walton, Mae Elizabeth.....	7
Skiles, Frank Chambers.....	13	Warner, LeRoy.....	2
Smith, Harold Kellogg.....	4	Warner, Rawleigh.....	12
Snyder, Clifford Walter.....	6	Weeks, Robert Ellsworth, Jr.....	15
Snyder, Homer Virgil.....	8	Weigand, Albert Philip.....	7
Soelke, Elsa Dorothy.....	7	Weil, Henry Teller.....	15
Sommerfeld, Nate.....	8	Wellner, George August William.....	3
South, Donald Corbly.....	7	Wells, Katherine.....	4
Spears, Robert Minier.....	10	Welsh, Donald.....	11
Speed, Louise Marie.....	15	West, Harry Stanley.....	3
Spencer, May Sarah.....	15	Westfall, Mildred Storey.....	7
Spies, Philip Matthew.....	7	Wheeler, Laura Elizabeth.....	8
Springer, Walter William.....	9	White, William Albert.....	11
Stark, Frank Bernard.....	10	Whitmore, Joseph Ralph.....	3
Stearns, Richard Irving.....	10	Wilder, Joseph Brown.....	5
Stebbins, Harry Eugene.....	14	Wilder, Paul.....	9
Stein, Paul Fred.....	5	Williams, Andrew.....	8
Stephens, Harold Alfred.....	3	Williams, Edith Florence.....	3
Stewart, William.....	15	Williams, Margaret Florence.....	7
Stoddard, Edward Woodhull.....	8	Wilson, Benjamin.....	11
Street, Helen Delia.....	8	Wolf, Carl.....	15
Street, Lloyd Gilbert.....	12	Wolf, Estella.....	9
Strickland, Robert Tiras.....	3	Wolff, Benjamin.....	8
Swenson, Henry.....	10	Wolfson, Ida.....	2
Taylor, Genevieve Elisabeth.....	3	Wright, George Reed, Jr.....	3
Taylor, Hazel Emma.....	7	Wyre, Donald Hay.....	15
Taylor, Lulu.....	3	Wyre, Dwight Emorest.....	12
Templeton, Kenneth Stuart.....	7	Yaxley, Leona Delia.....	15
Thomas, Patrice Jessie.....	3	Yaxley, William Ernest.....	4
Thompson, Walter Thomas.....	3	Youkey, William Vincent.....	9
Thoms, Elsa.....	3	Zimmerling, Cora Leonor.....	3
Thomson, Elisabeth Towles.....	15		

Unclassified Academy Students.

Male

Allinger, Louis	Kreuter, William
Arado, Anthony Dominick	Kruger, Joseph
Arnd, Frederick Harding	Kuttler, Fred
Avery, Frank George	Lewis, Joel Conover
Baldwin, George Sheldon	Lipkowski, Charles Thaddeus
Barber, Russell Marshall	Little, Bernard
Bates, Sidney Eaton	Lokken, Ole Knut
Binder, Byron Octavius	Lorimer, William
Blenkinsopp, Joseph William	Lovell, Wendell Blodgett
Boyd, Paul Rankin	Lundy, George Francis
Brown, Edward James	MacVicar, James Stephen
Brown, Reuben Robert	MacWhirter, David Alexander
Buchholz, Henry George	Mahon, Thomas Butler, Jr.
Burkhardt, Oscar Martin	Mahony, William Howard
Busse, Walter	Marx, Zero
Carpenter, Warren Elmer	McNichols, Richard Perry
Chamberlain, James Percy	Medbery, William Martin
Chappell, Harold Winthrop	Merrill, Harold Victor
Cleary, William	Millar, Hervey Gill
Cooley, Arthur Brandt	Miller, Carter
Cooling, Arthur	Miller, William Elwood
Cope, Robert William	Mulock, Lester
Cross, Roy Thomas	Munos, Ignatius Cruz
Cushing, Thurber Wesson	Nelson, Herman
Dahlke, Leslie Herman	Newell, Gordon
Dernbach, William Adam	Olsen, Oscar Oliver
Dodge, Louie Burton	Olson, Oliver Opheim
Dowdle, Thomas Patrick	Pabst, August, Jr.
Fisher, Clarence Henry	Palmer, Hugh Gordon
Fortner, Harmon Tuthill	Parsons, Douglass
Fowler, Martin Lawrence	Peterson, Harold T.
Fridrich, George Paul	Piper, Warren Jerome
Gibson, Le Roy	Plummer, Walter Ludwig
Glore, Charles Foster	Pohl, Charles Joseph
Grace, John George	Price, Jack Francis
Greaves, Sidney	Prosser, Treat Dickinson
Hall, Isaac Shellabarger	Rathje, Frank
Harris, James Loring	Reebie, Arthur William
Heaton, Lee Wilbert	Rehak, Charles
Heggeland, Norman Frederick	Roberts, Albert Edward
Henderson, Byron	Rodatz, Jacob Howard
Henkel, Raymond Frederick	Ruehl, Fred
Henry, Fred John	Ryder, LaVerne D'Eugene
Hopkins, Burrirt	Schanze, Harry
Horton, Aaron	Schneider, Arnold George
Hutton, James Wilson	Schrader, Harold
Jacobson, Oscar Isadore	Schwinkendorff, Henry
Juhnke, Albert Joseph	Shaffner, Irving Ross
King, Bismarck	Shipman, Walter Roger
King, Ralph William	Simpson, Clarence Melvin
Kistenbroker, Waldemar	Slotkovits, Samuel Edward
Koehn, Carl Louis	Smith, Harry Albert
Kornbrod, Joseph	Smith, Townsend Beverly
Krafft, Walter Edward	Stein, Sol
Kramer, Harold Frederick	Stephens, Harold Paul
	Stewart, George August
	Strom, George Allen

Swanson, Ephraim
 Tansell, Robert Weeden
 Thomas, Edward Gustave
 Thomas, William Clark
 VanHoesen, Hugh Gealey
 Voss, Carl Leon
 Wadsworth, Francis Wheeler
 Weigle, George William
 Westland, Edward Walker
 Widell, Edward Sidney
 Williams, Henry Long
 Woodford, Leonard
 Woolf, Joseph
 Zdzianowski, Raymond Henry
 Zitzewitz, Walter

Female

Alderson, Mary Elizabeth
 Anderson, Eliza Adess
 Balis, Grace Kate
 Barr, Jennie Louise
 Baty, Jeannette
 Biermann, Adela Louise
 Birkland, Evelyn Isabel
 Bishop, Grace Viola
 Bomaah, Lillian Beatrice
 Brown, Florence
 Buchhols, Martha
 Burkhardt, Olga Alma
 Collins, Miriam Ruth
 Coney, Eleanor Elizabeth
 Coulter, Gretchen
 Cudney, Ruth Marie
 Dacey, Rosanna
 Denison, Julia Adelaide
 Dods, Margaret Whitney
 Doig, Jessie Mackay
 Doussang, Delia Louise
 Gazzolo, Millie Edith
 Gephart, Laura Grace
 Geringer, Julia Victoria
 Ginsburg, Jane
 Goldsmith, Georgiana
 Graves, Kate Rogers
 Grubb, Florence Delilah
 Hall, Bessie
 Harrigan, Ethalinda
 Heineman, Elsa Margaret
 Holabird, Amy Bird
 Holstein, Rosalie Mae
 Hotchkiss, Annie Emerson
 Hurley, Olive Laurens
 Irwin, Caroline Aramesia
 Jaycox, Majorie Easter
 Krueger, Martha Augusta

Lagoni, Dagmar
 Leggett, Jeannette
 Leland, Lucy Mario
 Levinson, Leah Lechner
 Lewis, Annie
 Madsen, Kathrine
 Marwood, Nettie Elizabeth
 Mast, Leonora Martha
 Masters, Ada Louise
 Matuszewski, Wanda
 McKee, Fae Ruby
 McNulty, Anna May
 Menendes, Juanita Adeline
 Miller, Ida May
 Mills, Ivy Irene
 Moore, Roxie
 Niedermann, Malvina Dorothy
 Noone, Helen
 O'Mara, Loretto
 Ostergreen, Eleanor Margurette
 Oswald, Emily Marguerite
 Pickering, Florence Knapp
 Preuss, Amanda
 Rogers, Frances Ann
 Rolfe, Pearl Louise
 Roth, Myrtle Estelle
 Russell, Beatrice
 Sheehan, Anna Loretta
 Skallerup, Beulah Matilda
 Solomon, Grace Geraldine
 Soltenberg, Dora
 Spelman, Mrs. Nellie Eba
 Stewart, Cecil Maude
 Stocker, Gertrude Marie
 Stone, Annette
 Thompson, Nathalie Louise
 Thorndyke, Clara Louise
 Thorp, Lovey Mabel Ida
 Thorp, Lulu Alice Victoria
 Triner, Libbie Josephine
 Tyrrell, Mary Flora
 Uchtman, Lilian
 Uthe, Stella Elizabeth
 Vognild, Elvira Amanda
 Walther, Felicia
 Ward, Grace Irene
 Weare, Pauline
 White, Mildred Lydia
 Williams, Laurelet Clement
 Wilson, Elizabeth Dorothy
 Wood, Veda Palmer
 Woolf, Myrtle Ruth
 Worthmann, Estella
 Young, Ina Pearl
 Zitzewitz, Harriet Elsa
 Zuckerman, Sophie Ethel

Summary of Attendance, 1906-7.

Students in Day Classes.....	1303
College Students.....	328
Engineering Students (Men).....	117
Science and Arts Students.....	131
Men.....	30
Women.....	101
Unclassified Students.....	80
Men.....	49
Women.....	31
Academy Students.....	794
Classified.....	573
Boys.....	423
Girls.....	150
Unclassified.....	221
Boys.....	127
Girls.....	94
Summer Students (not counted above).....	181
Students in Evening Classes.....	1299
Total.....	<u>2602</u>

OCTOBER, 1902



Lewis Institute Bulletin

REGISTER OF 1901-2 AND
ANNOUNCEMENTS FOR 1902-3

CHICAGO

Published by THE LEWIS INSTITUTE, MEDICAL AND SCIENTIFIC,
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THE BULLETIN

OF THE LEWIS INSTITUTE OF SCIENCE

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A SUBSCRIPTION to the *Bulletin* of the University of Chicago is to be offered among the Alumni and the following Alumni year, 1907.

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LEWIS INSTITUTE BULLETIN

REGISTER OF 1907-8 AND
ANNOUNCEMENTS FOR 1908-1909



CHICAGO, OCTOBER, 1908

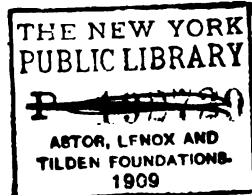


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CALENDAR

1908								1909							
JANUARY								JANUARY							
S.	M.	T.	W.	T.	F.	S.		S.	M.	T.	W.	T.	F.	S.	
..	..	..	1	2	3	4		..	..	..	..	..	1	2	
5	6	7	8	9	10	11		3	4	5	6	7	8	9	
12	13	14	15	16	17	18		10	11	12	13	14	15	16	
19	20	21	22	23	24	25		17	18	19	20	21	22	23	
26	27	28	29	30	31	..		24	25	26	27	28	29	30	
FEBRUARY								FEBRUARY							
..	..	..	..	..	..	1		..	1	2	3	4	5	6	
2	3	4	5	6	7	8		7	8	9	10	11	12	13	
9	10	11	12	13	14	15		14	15	16	17	18	19	20	
16	17	18	19	20	21	22		21	22	23	24	25	26	27	
23	24	25	26	27	28	29		28	..	..	..	..	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	
MARCH								MARCH							
1	2	3	4	5	6	7		..	1	2	3	4	5	6	
8	9	10	11	12	13	14		7	8	9	10	11	12	13	
15	16	17	18	19	20	21		14	15	16	17	18	19	20	
22	23	24	25	26	27	28		21	22	23	24	25	26	27	
29	30	31	..	..	..	..		28	29	30	31	..	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	
APRIL								APRIL							
..	..	..	1	2	3	4		..	..	..	..	1	2	3	
5	6	7	8	9	10	11		4	5	6	7	8	9	10	
12	13	14	15	16	17	18		11	12	13	14	15	16	17	
19	20	21	22	23	24	25		18	19	20	21	22	23	24	
26	27	28	29	30	..	..		25	26	27	28	29	30	..	
MAY								MAY							
..	..	..	..	..	..	1	2	..	..	..	..	..	..	1	
3	4	5	6	7	8	9		2	3	4	5	6	7	8	
10	11	12	13	14	15	16		9	10	11	12	13	14	15	
17	18	19	20	21	22	23		16	17	18	19	20	21	22	
24	25	26	27	28	29	30		23	24	25	26	27	28	29	
31	..	..	..	..	..	..		30	31	..	..	..	..	..	
JUNE								JUNE							
..	1	2	3	4	5	6		..	..	1	2	3	4	5	
7	8	9	10	11	12	13		6	7	8	9	10	11	12	
14	15	16	17	18	19	20		13	14	15	16	17	18	19	
21	22	23	24	25	26	27		20	21	22	23	24	25	26	
28	29	30	..	..	..	..		27	28	29	30	..	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	
JULY								JULY							
..	..	..	1	2	3	4		..	..	..	..	..	..	..	
5	6	7	8	9	10	11		5	6	7	8	9	10	11	
12	13	14	15	16	17	18		12	13	14	15	16	17	18	
19	20	21	22	23	24	25		19	20	21	22	23	24	25	
26	27	28	29	30	31	..		26	27	28	29	30	31	..	
AUGUST								AUGUST							
..	..	..	..	..	..	1		..	..	..	..	..	..	1	
2	3	4	5	6	7	8		2	3	4	5	6	7	8	
9	10	11	12	13	14	15		9	10	11	12	13	14	15	
16	17	18	19	20	21	22		16	17	18	19	20	21	22	
23	24	25	26	27	28	29		23	24	25	26	27	28	29	
30	31	..	..	..	..	..		30	31	..	..	..	..	..	
SEPTEMBER								SEPTEMBER							
..	..	1	2	3	4	5		..	..	1	2	3	4	5	
6	7	8	9	10	11	12		6	7	8	9	10	11	12	
13	14	15	16	17	18	19		13	14	15	16	17	18	19	
20	21	22	23	24	25	26		20	21	22	23	24	25	26	
27	28	29	30	..	..	..		27	28	29	30	..	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	
OCTOBER								OCTOBER							
..	..	..	..	1	2	3		..	..	..	..	1	2	3	
4	5	6	7	8	9	10		4	5	6	7	8	9	10	
11	12	13	14	15	16	17		11	12	13	14	15	16	17	
18	19	20	21	22	23	24		18	19	20	21	22	23	24	
25	26	27	28	29	30	31		25	26	27	28	29	30	31	
NOVEMBER								NOVEMBER							
1	2	3	4	5	6	7		1	2	3	4	5	6	7	
8	9	10	11	12	13	14		8	9	10	11	12	13	14	
15	16	17	18	19	20	21		15	16	17	18	19	20	21	
22	23	24	25	26	27	28		22	23	24	25	26	27	28	
29	30	..	..	..	..	..		29	30	..	..	..	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	
DECEMBER								DECEMBER							
..	..	1	2	3	4	5		..	..	1	2	3	4	5	
6	7	8	9	10	11	12		6	7	8	9	10	11	12	
13	14	15	16	17	18	19		13	14	15	16	17	18	19	
20	21	22	23	24	25	26		20	21	22	23	24	25	26	
27	28	29	30	31	..	..		27	28	29	30	31	..	..	
..	..	..	..	..	..	..		..	..	..	..	..	..	..	

Institute Calendar—1908-1909.

1908—

Jan. 6, Monday — Winter Quarter begins.

March 27, Friday — Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

April 6, Monday — Spring Quarter begins.

May 21, Thursday — Evening Classes end.

June 20, 27, Saturdays, from 9 A. M. to 1 P. M. — Preliminary Examinations for Admission.

June 26, Friday — Spring Quarter ends.

July 6, Monday — Summer Session begins.

Aug. 14, Friday — Summer Session ends.

Sept. 14-18, Monday to Friday — Final Examinations for Admission.

Sept. 21, Monday — Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.

Sept. 28, Monday — Autumn Quarter begins for students who were in regular attendance during the year 1907-1908.

Oct. 5-9, Monday to Friday, Evenings — Registration and Classification of Candidates for admission to Evening Classes.

Oct. 12, Monday — Evening Classes begin.

Nov. 26-27, Thursday and Friday — Thanksgiving Recess.

Dec. 18, Friday — Autumn Quarter ends.

HOLIDAY RECESS FOR TWO WEEKS.

1909—

Jan. 4, Monday — Winter Quarter begins.

Feb. 12, Wednesday — Centenary of Lincoln's Birth. A Holiday.

March 26, Friday — Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

April 5, Monday — Spring Quarter begins.

May 20, Thursday — Evening Classes end.

June 19, 26, Saturdays, from 9 A. M. to 1 P. M. — Preliminary Examinations for Admission.

June 25, Friday — Spring Quarter ends.

CORPORATION.

OFFICERS.

CHRISTIAN CECIL KOHLSAAT,
President.

THOMAS KANE,
Vice-President.

JOHN McLAREN,
Secretary and Treasurer.

TRUSTEES.

BERNARD ALBERT ECKHART,
OLIVER HARVEY HORTON,

THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN.

BOARD OF MANAGERS.

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GEORGE NOBLE CARMAN,
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OLIVER HARVEY HORTON,

EDMUND JAMES JAMES,
HARRY PRATT JUDSON,
THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN,

ADDISON ELDRED WELLS.

GEORGE NOBLE CARMAN, *Director.*

WILLIAM HERBERT HALL, *Business Manager.*

Officers of Administration and Instruction.

ADMINISTRATIVE OFFICERS.

GEORGE NOBLE CARMAN, A. M.

Director.

EDWIN HERBERT LEWIS, Ph. D., Litt. D.

Dean of College Students.

CHARLES WESLEY MANN, A. M.

Dean of Academy Students.

ALEXANDER WILLETT MOSELEY, S. B.

Head of Department of Engineering.

GEORGE PLIMPTON ADAMS, A. B.*

Dean of Academy Students, Registrar of the Institute.

OFFICERS OF INSTRUCTION.

(The names in each group appear in the order of appointment to the group.)

GEORGE NOBLE CARMAN, A. M.

Professor of Economics.

EDWIN HERBERT LEWIS, Ph. D., Litt. D.

Professor of English.

CHARLES WESLEY MANN, A. M.

Professor of History.

PHILIP BELL WOODWORTH, B. S., M. E.

Professor of Physics.

CLARENCE ELBERT DEPUY, B. S.

Professor of Machine Design and Construction.

ALEXANDER WILLETT MOSELEY, S. B.

Professor of Mechanics.

WARREN RUFUS SMITH, Ph. D.

Professor of Chemistry.

HERBERT EDGAR COBB, A. M.

Professor of Mathematics.

FRED A. ROGERS, B. S.

Assistant Professor of Physics.

JOSEPH RALPH NELSON, A. M.*

Assistant Professor of Latin.

JESSIE LOUISE JONES, Ph. D.

Assistant Professor of German.

* Resigned

GEORGE LEE TENNEY, A. M.**

Assistant Professor of Latin.

DUANE STUDLEY, B. S.

Assistant Professor of Mathematics.

CHARLES EMERSON PEET, B. S.

Assistant Professor of Physiography.

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Assistant Professor of English.

BERKELEY JOHN THOMAS, A. M.

Assistant Professor of Mathematics.

JOHN DERK NIES, B. S.

Assistant Professor of Physics.

HELEN DOUGAL STREET, A. M.

Assistant Professor of Latin and History.

DIC HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry.

GEORGE PLIMPTON ADAMS, A. B.*

Assistant Professor of Psychology and Philosophy

LEA RACHEL DELAGNEAU

Instructor in French.

LOUIS EDWARD POPE

Instructor in Mathematics.

MARIE ELSA BLANKE

Instructor in Freehand Drawing.

GEORGE ALEXANDER ROSS

Instructor in Woodwork.

CHARLES EDGAR HOYT

Instructor in Foundry Work.

EDWARD BURTON DEGROOT

Instructor in Physical Culture.

JULIA DUMKE PEET, Ph. B.

Instructor in German.

CHARLES SCHENCK,*

Instructor in charge of Mechanical Drawing.

EDWARD HERMAN LAY, A. B.

Instructor in Mathematics.

WILLIAM PARKER HAWLEY, B. S.

Instructor in Mechanical Drawing.

JESSE MYRON OWEN, Ph. B.

Instructor in English.

KATE BELLE MILLER, Ph. B.

Instructor in English.

ETHEL PERCY ANDRUS, Ph. B.

Instructor in English.

** Absent on leave.

* Resigned

OFFICERS OF INSTRUCTION.

9

- JOSEPH EDWARD HORA, B. S.**
Instructor in Chemistry.
- KATHERINE ISABEL INGERSOLL**
Instructor in charge of Sewing and Millinery.
- ABIGAIL FLORENCE WILLIAMS, M. L.***
Instructor in English.
- HORACE BERNARD McCABE**
Instructor in Machine Shop Work.
- EDWARD LESTER WHEELER**
Instructor in Physical Culture.
- MINNA CAROLINE DENTON, A. M.**
Instructor in Physiology and Bacteriology.
- MABEL THACHER WELLMAN, A. B.**
Instructor in Domestic Economy.
- ALPHONSO WIRTH CAVANAUGH**
Instructor in Mathematics.
- ANNA ELIZABETH DRUMMOND, A. B.**
Instructor in English.
- BERTHA H. GELDERS, Ph. B.***
Instructor in German.
- ELIZABETH LUCE †**
Instructor in Cookery.
- HELMUT BERENS, A. B.**
Instructor in German.
- FREDERICK LESTER HAVENS**
Instructor in Forge and Machine Shop Work.
- ALMA MARY HOLDEN, Ph. B.**
Instructor in Latin and History.
- CALEB EDWARD SUMMERS, B. S. in E. E.***
Instructor in Mechanical Drawing.
- JUSTIN WYMAN LUDLOW, M. E., C. E.**
Instructor in Mechanics.
- EDNA NOBLE WHITE, A. B.***
Instructor in Cooking.
- FRED LEWIS TURNER, A. B.**
Instructor in Latin.
- MILO MILTON QUAIFF, Ph. D.**
Instructor in History.
- ZOURA LANE CLARK, A. B.**
Instructor in English.
- EDNA NEWTON McCALLUM, A. B.**
Instructor in Latin.
- GEORGE FREDERICK CASSELL, A. B.**
Instructor in German.
- * Resigned † Deceased

GRACE EMERSON MOORE
Instructor in Cooking.

VICTOR LOUIS SHERMAN
Instructor in Mechanical Drawing.

FRANCES TALCOTT
Librarian.

IDA ELLEN SERVEN *
Assistant in Public Speaking.

NELLE GILL *
Assistant in Latin and English.

LOIS MARTIN
Assistant in Sewing.

GRACE LUCILE HENNECKE
Assistant in Millinery.

JOHN PAUL BAIRD
Assistant in Woodwork.

ROBERT FREDERICK BIESEMEIER
Assistant in Machine Shop Work.

RHODA EDYE
Assistant in Physical Culture.

MARGUERITE ROESCHLAUB *
Assistant in Sewing.

JANE HEAP
Assistant in Decorative Metal Work.

JUDSON E. WEBB
Assistant in Pottery.

* Resigned.

General Information.

Historical Sketch.

The Lewis Institute owes its existence to the late Allen C. Lewis, who, by his will, which was admitted to record November 1, 1877, left a large part of his estate for the support of the Institute, and provided for its organization. Articles of incorporation for the Institute thus projected were granted by the Secretary of the State of Illinois, July 9, 1895.

James M. Adsit, Henry F. Lewis, and Hugh A. White were named in the will as the first trustees of the estate, the estimated value of which in 1877 was five hundred and fifty thousand dollars. Credit is due to these trustees, and especially to Hugh A. White, for management so efficient that the estate amounted, when turned over to the trustees of the Lewis Institute, November 21, 1895, to one million six hundred thousand dollars.

John A. Roche, Christian C. Kohlsaat, and John McLaren, under whom the Institute was incorporated, constituted the board of trustees from May 28, 1894, until the completion of the first buildings. The sites previously chosen having proved unsuitable, the trustees selected and purchased, at an expense of one hundred and sixty-nine thousand dollars, the principal portion of the block extending from Monroe street to Madison, between Winchester avenue and Robey street. This site is centrally located in the West Division of Chicago, and is easily accessible from all parts of the city by means of several lines of surface cars, and the Lake street and the Metropolitan elevated roads.

The erection of the first buildings was begun in May, 1895. The Institute was opened in September, 1896.

Scope of Work.

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in four main divisions, viz.: Mechanical Engineering; Mechanic Arts; Domestic Economy; the Liberal Arts. The Institute grants the degree of Mechanical Engineer, the title of Associate in Arts, and the Academy Certifi-

cate. The degree represents four years of college work, the title two years of college work, and the certificate four years of academy work.

Requirements for Admission.

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

Applicants for admission other than those mentioned above will be examined on such subjects as are prerequisites for the studies which they wish to pursue.* In all cases the test will call for intelligence rather than for technical knowledge.

Assignment of Studies.

On entering the Institute a student is assigned to such studies

* For example, applicants for entrance into the first year of academy work will be examined on English, arithmetic, history of the United States, and geography, as taught in the Chicago grammar schools.

as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Courses of Instruction" and "Units."

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

A unit consists regularly of three academy courses (a year's work) in any given subject.

The Degree of Mechanical Engineer.

To be enrolled as a candidate for the degree of Mechanical Engineer, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 19-36:

Courses	Units
English, 1-9	3
Mathematics, 1-6, 10-12.....	3
German, A-F.....	2
Science, or additional foreign language	2
History, 4-6.....	1
Physics, 1-3.....	1
Drawing, Mechanic Arts, 1, 5, 6	1
Shopwork, Mechanic Arts, 2, 3, 4, 7, 19, 20	2

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Mechanical Engineer. The requirements are shown in detail in the curriculum (see next page).

The Title of Associate in Arts.

To be enrolled as a candidate for the title of Associate the student must offer fifteen units of high school work, three of which shall be in English and two in Mathematics. A unit is a course of study covering a school year of at least 36 weeks, with 4 or 5 recitation periods a week, amounting to not less than 120 hours.

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

The Title of Associate in Domestic Economy.

To obtain the Title of Associate in Domestic Economy the student must secure, in addition to fifteen admission units, credit for the prescribed work in Chemistry, Physiology, Bacteriology, and Domestic Economy (seventeen courses), and one course in English Composition.

The Academy Certificate.

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and opportunities.

**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM LEADING TO
DEGREE OF MECHANICAL ENGINEER***

AUTUMN QUARTER	Course.	Hours.	WINTER QUARTER	Course.	Hours.	SPRING QUARTER	Course.	Hours.
FIRST YEAR.								
English.....	1	5	English.....	1	5	English.....	3	5
Algebra.....A W	1	5	Algebra.....W S	5	5	Algebra.....A S	3	5
Machine Sketching..E	1	10	Wood Shop.....E	1	10	Instrum'tl Draw'g..E	5	10
Physiography.....A S	1	10	Physiography.....	1	10	Physiography.....	3	10
SECOND YEAR.								
English.....	4	5	English.....	5	5	English.....	6	5
Plane Geometry..A W	4	5	Plane Geometry..W S	5	5	Plane Geometry..A S	6	5
Projection Draw'g..E	6	10	Forge Shop.....E	3	10	Foundry.....E	4	10
German.....	A	5	German.....	B	5	German.....	C	5
THIRD YEAR.								
American History....	4	5	American History....	5	5	American History....	6	5
Physics.....	1	10	Physics.....	2	10	Physics.....	3	10
Machine Shop.....E	19	10	Machine Shop.....E	20	10	Pattern Shop.....E	7	10
German.....	D	5	German.....	E	5	German.....	F	5
FOURTH YEAR.								
English.....A W	7	5	English.....W S	8	5	English.....	9	5
Algebra.....A W	10	5	Algebra.....W S	11	5	Solid Geometry.....	12	5
Pattern Shop.....	8	10	Machine Shop.....E	22	10	Machine Shop.....E	22	10
German.....	G	5	German.....	H	5	German.....	I	5

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF MECHANICAL ENGINEER**

FIRST YEAR.								
English.....	A	5	English.....	B	5	English.....	C	5
Algebra.....A W	13	5	Trigonometry...W S	14	5	Analyt'l Geometry..	15	5
Chemistry.....	1	14	Chemistry.....	2	14	Chemistry.....	3	14
Machine Draw'g....E	10	10	Machine Sketching..	11	10	Surveying.....	13	10
SECOND YEAR.								
Economics.....	10	5	Economics.....	11	5	Industrial History..	12	5
Calculus.....	16	5	Calculus.....	17	5	Calculus.....	18	5
Physics.....	4	15	Physics.....	5	15	Physics.....	6	15
Kinematics.....	28	7	Descriptive Geom'ty	25	7	Machines.....	15	7
THIRD YEAR.								
Mechanics.....	16	5	Mechanics.....	17	5	Mechanics.....	18	5
Thermodynamics....	43	7	Machine Shop.....	23	10	Valve Gears.....	31	10
Electrical Laborat'y.	35	10	Electrical Laborat'y	36	10	Electrical Laborat'y	37	10
Machine Draw'g..A S	12	10	Foundry.....	9	10	Mach. Tool Anal....	24	10
FOURTH YEAR.								
Hydraulics.....	42	5	Hydraulic Machin'y	47	5	Power Plants.....	49	10
Machine Design.....	32	6	Machine Design.....	44	10	Machine Design.....	27	6
Chemistry.....	22	5	Chemistry.....	23	8	Chemistry.....	24	13
Materials of Const..	46	10	Struct'l Steel Work	33	10	Specifications and	50	2
Thesis.....		5	Thesis.....		2	Thesis.....		2

*When a Course is given in more than one quarter, the quarter is indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring.

**SUGGESTED ACADEMY AND COLLEGE CURRICULUM LEADING
TO TITLE OF ASSOCIATE IN ARTS.**

AUTUMN QUARTER	Cours.	Hours.	WINTER QUARTER	Cours.	Hours.	SPRING QUARTER	Cours.	Hours.
FIRST YEAR.								
English	1	5	English.....	2	5	English.....	3	5
Algebra..... A W	1	5	Algebra..... W S	2	5	Algebra..... A S	3	5
Latin.....	1	5	Latin.....	2	5	Latin.....	3	5
Physiol. or Physiog....	1	10	Physiol. or Physiog....	2	10	Physiography.....	3	10
SECOND YEAR.								
English	4	5	English	5	5	English.....	6	5
Plane Geometry... A W	4	5	Plane Geometry... W S	5	5	Plane Geometry... A S	6	5
Latin.....	4	5	Latin.....	5	5	Latin.....	6	5
Ancient History.....	1	5	Ancient History.....	2	5	Ancient History.....	3	5
THIRD YEAR.								
American History . . .	4	5	American History . . .	5	5	American History . . .	6	5
Physics.....	1	10	Physics.....	2	10	Physics.....	3	10
Latin.....	7	5	Latin.....	8	5	Latin.....	9	5
German..... A	5	5	German..... B	5	5	German..... C	5	5
FOURTH YEAR.								
English.....	7	5	English.....	8	5	English.....	9	5
Algebra..... A W	10	5	Algebra..... W S	11	5	Solid Geometry.....	12	5
Latin.....	10	5	Latin.....	11	5	Latin.....	12	5
German..... D	5	5	German..... E	5	5	German..... F	5	5
FIFTH YEAR.								
English	10	5	English.....	11	5	English.....	12	5
European History.....	7	5	European History . . .	8	5	European History.....	9	5
Latin or.....	13	5	Latin or.....	14	5	Latin or.....	15	5
German or.....	4	5	German or.....	5	5	German or.....	6	5
French.....	1	5	French.....	2	5	French.....	3	5
SIXTH YEAR.								
English.....	13	5	English.....	14	5	Geology.....	4	5
Latin or.....	16	5	Latin or.....	17	5	Latin or.....	18	5
Economics or	10	5	Economics or	11	5	Industrial History or..	12	5
German or.....	7	5	German or.....	8	5	German or.....	9	5
French.....	4	5	French.....	4	5	French.....	5	5

**TWO-YEAR COLLEGE CURRICULUM LEADING TO TITLE OF
ASSOCIATE IN DOMESTIC ECONOMY.**

FIRST YEAR.											
Chemistry.....	A	10		Chemistry.....	B	10		Chemistry.....	C	10	
Cooking.....	4	10		Cooking.....	5	10		Plant Physiology.....	5	10	
Sewing.....	D	10		Sewing.....	E	10		Sewing.....	F	10	
English.....	10	5									
SECOND YEAR.											
Physiology.....	4	10		Bacteriology.....	5	10		Sanitation.....	10	5	
Food and Dietetics.....	7	10		Food and Dietetics.....	8	10		Economics of Home...	9	5	
Sewing.....	G	10		Sewing.....	H	10		Sewing.....	1	10	
								Cooking.....	6	10	

Half-Day, Evening, and Summer Courses.

As a rule, students in the day classes are expected to make their work systematic by aiming definitely toward the degree, the title, or the certificate. It is recognized, however, that many students are obliged to leave school in order to take care of themselves and those dependent upon them, at a time when their more fortunate associates enter upon such courses of instruction as are herein outlined. To such students the Institute offers opportunities for special instruction in accordance with their needs, particularly in the line of shopwork, mechanical drawing, and domestic economy. Such as can attend the Institute but half of each day may, by prolonging the time requirement, complete the work of some one group of studies, or at least make advancement in one or more subjects.

Provision has also been made for such evening instruction as will enable young men and women who are employed during the day to continue their education along those lines which will be of the most service to them in the work in which they are engaged. In point of number of students and benefits derived by them no work of the Institute is more important.

The summer courses are designed for students who wish to shorten the time necessary for completing the work required for graduation, to make up deficiencies in scholarship, or to pursue special courses in the shops or laboratories. Any course of instruction offered by the Institute will be repeated during the summer, if the demand is such as to justify the formation of a class.

Tuition and Fees.

Day students are required to pay a registration fee of five dollars. This fee is due at the time of registration. The rate of tuition for day students is twenty dollars a quarter. Where a student limits himself to one course of instruction, with five hours of class work each week, there is a reduction of ten dollars a quarter. In laboratory, drawing, and shopwork, ten hours, or a fraction thereof, count as five in determining the charge.

The rate for evening students is five dollars for a term of ten weeks for one course of instruction, two evenings a week, and ten dollars for two courses, four evenings a week.

The tuition for the summer term for each course of five hours a week of class instruction is five dollars. Students who attend only in the summer are not required to pay the registration fee.

Both day and evening students who take one or more shop or laboratory courses in the departments of physics, chemistry, engineering, and cookery are required to pay a shop or laboratory fee of five dollars a quarter or term.

Students in chemistry deposit five dollars to cover breakage. If the charges do not amount to five dollars, the excess is returned to the student.

All payments are due in advance, on the first day of the quarter. Checks and money orders should be made payable to Lewis Institute.

Scholarships.

Three scholarships, each amounting to one year's tuition, have been established under the will of the late Mrs. Hugh A. White. Mr. John McLaren was named in the will to assign these scholarships.

Three additional scholarships, amounting respectively to one, two, and three quarters' tuition, are assigned by the Institute for excellence in public speaking. These scholarships are assigned in the fourth year of the academy work and are available in the first year of college.

Standings and Reports.

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline.

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction.

NOTE.—The Courses of Instruction offered are tabulated on pages 15 and 16, and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20, 22; Mathematics, 1-12; Physics, 1-3; Physiography, 1-2; Physiology, 1-2; Domestic Economy, A-C, 1-3; History, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-12, 21, 23, 24; Engineering, 13-50; Mathematics, 13-18; Physics, 4-6; Chemistry, A-24; Geology, 4; Physiology and Bacteriology, 3, 4, 5; Domestic Economy, D-I, 4-7; History and Economics, 7-12; English, 10-14, A-C; German, 1-9; French, 1-9; Latin, 13-19.

Mechanic Arts.

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who are preparing for the profession of mechanical engineer. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. **MACHINE SKETCHING.** Constructive work in perspective. Dimensioned sketches of machine parts.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. **WOOD WORK.** A continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes, and finishes. Practice with woodworking machinery.

3. **FORGE WORK.** Simple forging. Hardening and tempering. Work with steam hammer.

4. **FOUNDRY WORK.** Study of modern foundry construction, equipment, materials, and methods. Practice in molding, coremaking melting, and pouring.

5. **INSTRUMENTAL DRAWING.** The first work with drawing instruments. Lettering and conventional representation of threads, bolts and nuts, and fastenings. Construction of mathematical curves. Designed to establish standard methods.

6. **PROJECTION DRAWING.** Planes of projection; intersections, including conic sections; revolution of views and development of surfaces.

7. **PATTERN MAKING.** Practice in making simple patterns. Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

8. **PATTERN MAKING.** A continuation of Course 7.

9. **ADVANCED FOUNDRY WORK.** Problems introduced by heavy castings, production, and molding machines; foundry equipment and arrangement; correlation of work of foundry with that of pattern shop, machine shop, and drafting room.

10. **MACHINE DRAWING.** Making of detail drawings and assembly drawings of machines; tracing.

10a. **MACHINE DRAWING.** A continuation of Course 10. Mechanical drawing and tracing.

11. **ADVANCED MACHINE SKETCHING.** Making of perspective sketches from mechanical drawings and empirical formulas. Intended to develop the student's sense of proportion and to acquaint him with the mechanism and details of certain machines.

12. **ADVANCED MACHINE DRAWING.** Gearing and cams. Problems to develop the adaptive and inventive faculties of the student. Consideration of shop processes and limitations of tools. Tracing. Prerequisite: *Engineering 28.*

19. **BENCH METAL WORK.** Description of the materials commonly used in machine work and the tools employed in bench and floor work; practice in chipping, filing, laying-out, and other processes.

20. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

21. **FORGE WORK.** Jig, steam hammer, and special work. Shop methods, cost estimating, forge shop equipment.

22. **MACHINE TOOL WORK.** (One or more quarters.) Practice with machine tools, hand tools, standard gauges, and measuring instruments in making, finishing, and assembling machines and machine parts, taps, dies, reamers, milling cutters, punching and drawing dies.

23. **GEAR AND CAM CONSTRUCTION.** Practice with machine tools and instruments in the application of the principles of mechanism to the construction of spur, bevel, and spiral gears, racks, and cams. Prerequisite: *Mechanic Arts 12 and Engineering 28.*

24. **MACHINE TOOL ANALYSIS.** The study of existing machines and tools to determine the principles involved in their construction; examining and testing of machines and mechanisms for rigidity, accuracy, or efficiency.

Engineering.

The courses grouped in this division are open to college students and include applied mathematics, applied electricity, testing of machinery and materials, machine design, and thesis. These courses, in conjunction with the college mathematics, chemistry, physics, mechanic arts, English, history, and economics, lead up to the degree of Mechanical Engineer. The studies are so arranged, however, that those students in engineering who do not expect to receive the degree may derive much benefit by closely following the regular arrangement of studies during the time that they are able to remain at the Institute.

13. **SURVEYING.** Measurement of distances by pacing, chain, and tape. Practice in the use of compass, transit, and level in land and city surveying, leveling, and the running of simple railway curves. Study of the construction, testing, and adjustment of instruments. Field records and office copies. Prerequisite: *Mechanic Arts 1 and 6; Mathematics 14.*

15. **MACHINES.** Elements of the steam engine, steam boiler, pump, and other machines. The steam engine is studied more especially as a heat engine and as a kinematic machine in preparation for the regular courses in thermodynamics and valve gears. Measurement of power. Prerequisite: *Course 28.*

16. **MECHANICS, STATICS.** Composition and equilibrium of concurrent and non-concurrent forces; suspended weight and catenary. Prerequisite: *Physics 4; Mathematics 18.*

17. **MECHANICS, DYNAMICS.** Rectilinear motion; virtual velocities; moment of inertia; dynamics of a rigid body; work, energy, and power; friction. Prerequisite: *Course 16.*

18. **MECHANICS, STRENGTH OF MATERIALS.** Elementary stresses and strains; flexure of beams; continuous girders; flexure of long columns; combined stresses. Prerequisite: *Course 17.*

25. **DESCRIPTIVE GEOMETRY.** Graphical methods for the solution of problems in the intersections of lines and surfaces. Prerequisite: *Mechanic Arts 11; Mathematics 15.*

27. **MACHINE DESIGN.** Stresses in machine parts, especially under the conditions of motion. Prerequisite: *Course 32.*

28. **KINEMATICS.** A study of the laws of the communication of motion by mechanisms. Rolling and sliding contact, linkwork, belts and bands, aggregate combinations. Prerequisite: *Mechanic Arts 11; Mathematics 15.*

31. **VALVE GEARS.** The application of the principles of the courses in *Machines (15), Kinematics (28), and Thermodynamics (43), to the study of various types of valves and valve gears.* Prerequisite: *Courses 28 and 43.*

32. **MACHINE DESIGN.** The elements of steam-engine design. Prerequisite: *Courses 31 and 43.*

33. **STRUCTURAL STEEL WORK.** The study of the stresses and details of the plate girder, roof truss, and simple pin-connected bridge. Current specifications. Prerequisite: *Course 46.*

35. **DIRECT CURRENT PRINCIPLES AND PRACTICE.** Magnetic and electric calculations for generators and motors; armature windings; characteristic curves; wiring; instruments. Prerequisite: *Physics 6; Mathematics 18.*

36. **ALTERNATING CURRENT PRINCIPLES.** Sine functions; vectors; reactance; condensance; impedance; series parallel circuits; transmission lines. Prerequisite: *Course 35.*

37. **ALTERNATING CURRENT MACHINERY.** Transformer; generator; induction motor; synchronous motor; rotary converter. Prerequisite: *Course 36.*

42. **HYDRAULICS.** The mechanics of fluids at rest and in motion; flow of water through orifices and pipes; pumps and motors. Prerequisite: *Course 17.*

43. **THERMODYNAMICS.** The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Course 15; Mathematics 18.*

44. **MACHINE DESIGN.** Study of the different types of boilers. Design of horizontal multitubular boiler. Stability of chimneys. Prerequisite: *Courses 18 and 43.*

46. **MATERIALS OF CONSTRUCTION.** The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Course 18.*

47. **HYDRAULIC MACHINERY.** The study of the design of a turbine. Calibration of pressure-tank, weir, and orifice. Test on flow of water. Tests of hydraulic machinery. Prerequisite: *Course 42.*

49. **POWER PLANTS.** Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses 43 and 44.*

50. **SPECIFICATIONS AND CONTRACTS.** A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

THE THESIS. During the senior year the student completes a thesis on some engineering subject. He is assigned to that instructor under whose supervision his subject of thesis properly lies. The three o'clock hour is set apart for thesis work, and the conferences between student and instructor are held at that time. The thesis will also be under the general supervision of an instructor in English, whom the student will meet at stated times to confer upon the manner of presentation. The thesis shall be typewritten and of standard dimensions and binding. It shall be deposited in the library before graduation. The Institute reserves the right of publication.

Mathematics.

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA.** Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. **ADVANCED ALGEBRA.** Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle

functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. **SOLID GEOMETRY.** Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. **ALGEBRA.** Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS.** Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS.** Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS.** Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics.

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize students with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. **GENERAL PHYSICS.** Mechanics: A discussion and illustration of physical quantities and their measurement; simple types of motion; density, velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. **LABORATORY PHYSICS.** Strictly quantitative, covering subjects named above.

2. **GENERAL PHYSICS.** Heat: Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. Sound: *Waves, sounds* and their relations, sonorous bodies, compound tones and

musical instruments. Light: Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves, color, and polarization. LABORATORY PHYSICS. Quantitative work in heat, sound, and light.

3. GENERAL PHYSICS. Electricity: Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. LABORATORY PHYSICS. Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators, and calibration of instruments.

4. MECHANICS. Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics* 14.

5. ELECTRICAL MEASUREMENTS. Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients; calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics* 14.

6. HEAT AND LIGHT. Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics* 14.

Chemistry.

The aim of the courses in chemistry is to give in the first place a knowledge of the fundamental principles of the science as a part of a general education; and afterwards a more extended knowledge of the subject and practice in manipulation to those who wish to devote themselves to pure or applied chemistry, or whose work along other lines will be made more efficient by a thorough training in chemistry. In the advanced work in chemistry a reading knowledge of German is assumed. Engineering students are encouraged to become familiar with the principles on which manufacturing processes or industrial methods are based, so that a firm foundation may be laid for subsequent specialization in these directions. Opportunities are given for excursions to the plants of chemical industries located in and near Chicago.

Courses A-C are intended to give students of domestic economy a general knowledge of the subject in a limited time.

A, B, C. CHEMISTRY. A study of the common elements and their compounds. Frequent qualitative and quantitative experiments and verification of chemical laws will be included in the laboratory work. Reference book, Newth's Inorganic Chemistry. Lectures, recitations, and laboratory work, ten hours a week.

The courses in general chemistry give a knowledge of the natural occurrence, methods of preparation, properties and reactions of the important elements and compounds, explain these facts according to modern theories,

and point out their application to industrial processes. The greater part of the laboratory work is qualitative, but it includes quantitative experiments involving both gravimetric and volumetric methods, and also a few inorganic preparations on a somewhat elaborate scale. Lectures and recitations, six hours a week; laboratory work, eight hours a week. Reference book, Newth's *Inorganic Chemistry*. Prerequisite: *Physics* 1-3.

1. GENERAL CHEMISTRY. Chemical change, three states of matter, solution and crystallization, elements and compounds, oxygen, hydrogen, and the elements of the chlorine group.

2. GENERAL CHEMISTRY. Continuation of Course 1. The remaining non-metallic elements; acids, bases, and salts; electrolysis.

3. GENERAL CHEMISTRY. Continuation of Course 2. The metals. Qualitative analysis is not taught, but some of the more important analytical reactions are studied, so that at the end of the course the student is expected to be able to recognize any simple salt and to understand the methods of separation of various groups and elements.

Students who have credit for the chemistry course of the ordinary high school are required to take the lecture and recitation work of 1, 2, and 3, but special laboratory work is arranged for them in the fall quarter. If they show suitable proficiency, they are excused from laboratory work for the rest of the year.

The courses in qualitative analysis begin with simple analysis and lead to the study of complex mixtures, minerals, alloys, etc. The lectures treat in considerable detail of certain selected portions of theoretical and physical chemistry, special reference being made to those principles which form the basis of analytical chemistry. Laboratory work, ten hours a week; lectures and recitations, three hours a week. Text-book, Prescott and Johnson's *Qualitative Analysis*. Prerequisite: *Courses* 1-3.

4. QUALITATIVE ANALYSIS. Classroom work on the principles of analysis. General qualitative analysis.

5. QUALITATIVE ANALYSIS. Continuation of Course 4. Lectures on theoretical chemistry.

The courses in organic chemistry consist of lectures and recitations on the simpler types of carbon compounds, and their preparation and purification in the laboratory. Lectures and recitations, three hours a week; laboratory work, twelve hours a week. Prerequisite: *Courses* 1, 2, 3, and 4.

7. ORGANIC CHEMISTRY. The work is based on Perkin and Kipping's *Organic Chemistry*. Aliphatic series.

8. ORGANIC CHEMISTRY. Continuation of Course 7. Aromatic series.

Courses 6 and 9 give the general methods of quantitative analysis. Courses 10 to 21, inclusive, give the application of these methods to the problems of particular industries. The work is largely individual, and may be given any quarter, as desired.

The laboratory work in each course is supplemented by the reading of special works treating of the respective subjects. Course 9 is prerequisite to Courses 10-19, and Courses 7 and 8 to Courses 17-19. Laboratory work, ten hours; lectures and recitations, two hours a week.

6. QUANTITATIVE ANALYSIS. Continuation of Course 5. Simple gravi-

metric and volumetric determinations leading to Course 9. Lectures and recitations on quantitative analysis.

9. **QUANTITATIVE ANALYSIS.** Moderately complex separations, volumetric precipitations, and oxidation and reduction.

10. **IRON AND STEEL ANALYSIS.** Including the microscopic structure.

11. **IRON ORE ANALYSIS.**

12. **WATER ANALYSIS.** Analysis of drinking water and of boiler feed water, including the analysis of boiler scale.

13. **FUEL ANALYSIS.** Especially the analysis of coke and coal, including calorific determinations.

14. **GAS ANALYSIS.** Including both flue gas analysis and illuminating and fuel gas analysis.

15. **CEMENT ANALYSIS.** Including materials and finished product.

16. **COMPLEX MINERAL ANALYSIS.** Including silicates, ores, and rare elements.

17. **OIL AND SOAP ANALYSIS.** Analysis of oils, lubricators, and soaps.

18. **PAINT ANALYSIS.** Including oils, varnishes, and pigments.

19. **FOOD ANALYSIS.** The testing of foods for quality and purity.

20. **INORGANIC PREPARATIONS.**

21. **ORGANIC PREPARATIONS.**

22 and 23. An abridged course in qualitative and quantitative analysis preparatory to 24. Prerequisite: *Courses 1-3.*

24. **ANALYSIS OF ENGINEERING MATERIALS.** The chemical tests commonly employed by engineers, including coal and gas fuel value determinations, flue gas analysis, lubricating oil tests, etc. Lectures on metallurgy are given as a part of this course. Prerequisite: *Courses 4 and 6 or 22 and 23.*

Physiography and Geology.

In the courses in physiography and geology, lectures, recitations, and laboratory methods of work are used. The aim in physiography 1, 2, and 3 is to give a broad introductory course that shall open up the field of science and give the student a notion of its methods and scope. Physical geography is made the central subject. The study includes observations on the heavenly bodies, such illustrated lectures and laboratory exercises as are necessary for the student to make good use of his observations, lecture table demonstrations and laboratory exercises on the elementary physical and chemical phenomena fundamental in understanding the problems taken up in the physical geography, and, finally, a study of life with especial attention to the physiographic control of the distribution of life and of man's activities.

1. **PHYSIOGRAPHY.** The distribution of matter in space. The celestial bodies, their number, their size, distances, materials (kinds, and amount compared with space), physical conditions, arrangement in space and motions, with emphasis on the motion of the earth and its relations to the sun and moon; elementary meteorology and climatology; oceanography. Knowledge of a certain amount of physics is involved: Density, pressure in liquids and in air, barometric phenomena, kinetic theory of gases, diffusion, properties of vapors, thermometry, change of state, transference of heat, specific heat, latent heat, atmospheric electricity. It is believed that there is economy in studying the broader principles first and their broader

applications in connection with the more immediate applications in the study of physical geography.

2. **PHYSIOGRAPHY.** Constituents of the atmosphere and their relations to life; oxidation, carbonation and hydration in the belt of weathering and their effects on the atmosphere and on climate; the work of underground water in solution and deposition from solution; crystallization; soils and the relation of plants to underground water and to soil; the modern doctrines of the origin and development of the surface features of the earth, the agencies involved, the resulting forms and the great examples of these forms; a study of the topographic features of the continents. The elementary chemistry involved is studied as it is needed.

3. **PHYSIOGRAPHY.** A study of life and life processes. Especial attention is given to the distribution of life on the earth, its relation to soil, to topographic and climatic features and the control of these things over man. Frequent references are made to these subjects in the fall and winter quarters. They are here taken up in more systematic fashion.

4. **GENERAL GEOLOGY.** The elementary features of dynamical, structural, and historical geology. Emphasis placed upon the leading facts and principles of the science and the more important events of geological history. For college students.

Prerequisite: Courses 1, 2 and 3; Physics 1-3, and Chemistry 1-3, or their equivalent.

Physiology and Bacteriology.

1, 2. **PHYSIOLOGY AND HYGIENE.** Elementary studies in histology, vertebrate dissection; experiments dealing with the chemical and physical processes of physiology; simple chemical tests applied to foods; experiments in digestion. House sanitation, public hygiene.

3. **PLANT PHYSIOLOGY** and botany of food plants.

4. **PHYSIOLOGY AND PERSONAL HYGIENE.** Human anatomy and physiology from lectures, text, and illustrative material. Points of contact between the study of physiology and subjects which concern practical conduct, e. g., physical training, diet, reaction of body to immediate environmental conditions, conservation of nervous energy.

5. **BACTERIOLOGY.** A laboratory course dealing with bacteria, yeasts, and molds. Studies in morphology, physiology, and reproduction; making of culture media, of permanent mounts; exercises in elementary analysis of air, milk, water, etc., from different sources.

Domestic Economy.

The courses in Domestic Economy are planned with reference to the needs of two classes of students: (1) Young women who are preparing to teach cooking and sewing; (2) Girls who wish to acquire a knowledge of the household arts in connection with other academy studies.

The teachers' courses in domestic economy are of college grade and presuppose a high school training. A two-year curriculum leading to the title of *Associate in Domestic Economy* is outlined on page 16.

Following are the courses of instruction that are offered in this department:

A. **SEWING.** Course designed for the younger pupils. Includes the making of plain undergarments, with talks on materials and implements used. Use of machine with simple attachments.

B. **SEWING.** Taking of measurements, making of undergarments continued, cutting from patterns.

C. **SEWING.** Cutting and making of shirtwaists, thin gowns, and dressing-sacks.

In connection with A, B, and C, four hours a week may be given to millinery.

D, E, F. **SEWING.** Courses designed for those who are preparing to teach; include, in addition to the sewing defined under A, B, and C, drafting, the study of textiles, and the principles of design. Simple designs in flat colors, such as borders, rugs, etc.; color harmony; lettering for monograms; proportions of the human figure; sketching from life; designs for undergarments, waists, dresses, hats, etc.

G, H, I. **SEWING AND MILLINERY.** A continuation of D, E, and F. Advanced sewing and millinery. Design as applied to dress. Textiles and weaving. The teaching of sewing and millinery in the elementary and the secondary school.

1, 2. **COOKING.** Courses designed for the younger pupils. Manufacture, selection, and preparation of food. Marketing, cooking, and serving.

3. **STUDY OF THE HOUSE.** A continuation of 1 and 2. Construction, furnishing, decoration and care of the house.

4. **COOKING.** Course designed for those who are preparing to teach. Nature and uses of food, and changes effected by heat, cold, and fermentation; uses and application of preservatives.

5. **COOKING.** A continuation of 4. Principles of the selection and preparation of foods. Care and manufacture of food.

6. **COOKING.** Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: Courses 7 and 8.

7. **FOOD AND DIETETICS.** A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry* A-C.

8. **FOOD AND DIETETICS.** A continuation of 7. Diet and dietaries. The detection of adulteration and preservatives in food.

9. **ECONOMICS OF THE HOUSEHOLD.** The cost of living and the apportionment of the income. A study of rent, fuel, light, and the like, with reference to cost and efficiency. Family budgets and their value. Methods of keeping household accounts. A special consideration of woman's changing economic position and the effect upon the family.

10. **SANITATION, HOUSEHOLD AND PUBLIC.** The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common transmissible diseases. Lectures and reference work, field excursions.

History and Economics.

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

A year is also given to economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. **ANCIENT HISTORY.** The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. **ANCIENT HISTORY.** The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. **ANCIENT HISTORY.** The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. **AMERICAN HISTORY.** The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, and the history of the English colonies to 1763.

5. **AMERICAN HISTORY.** The conflict between the colonies and England, with a study of the political differences between the two; the development of confederate government during the Revolution; the political and industrial growth of the United States, particularly of the West.

6. **AMERICAN HISTORY.** The beginning of sectional differences, acquisition and government of new territories; the fight for slavery extension; reconstruction and its effects; and the modern United States.

7. **EUROPE FROM THE FOURTH TO THE FOURTEENTH CENTURY.** An outline course in general European history covering the period from the Council of Nicea to the removal of the Papacy to Avignon, treating in such detail as the time will permit the civilization and institutions peculiar to the period.

8. **EUROPE FROM THE FOURTEENTH TO THE EIGHTEENTH CENTURY.** From the exile at Avignon to the close of the Seven Years' war. An outline study of the Renaissance, Reformation, Counter Reformation, Religious and Dynastic wars, and the struggle for colonial and commercial supremacy.

9. **EUROPE SINCE 1763.** The effects of the American Revolution on Europe, attempts at reform, the French Revolution, Napoleon, the Holy Alliance, reforms in England, and the unity of Germany and Italy.

10. **ECONOMICS.** The Consumption, Production, and Distribution of *Wealth*.

11. **ECONOMICS.** Money, Credit, and Banking; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform.

12. **ECONOMIC HISTORY SINCE 1750**, with special reference to the development of industry and commerce in the United States.

English.

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on pages 12 and 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is designed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, *First Manual of Composition*, revised edition; Lewis, *Introduction to the Study of Literature*; Moulton, *Old Testament Stories*; Shakspeare, *The Merchant of Venice*, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the *Riverside Literature Series*, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's *Life of Lincoln*. These books are referred to below by abbreviations.

1. Average sections cover *First Manual*, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover *First Manual*, II., and *Introduction*, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover *First Manual*, III., and *Introduction*, VI.-X. Special sections abbreviate *Introduction*.

4. Average sections cover *First Manual*, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover *First Manual*, V., Schurz's *Lincoln* (133), and Warner (37). Special sections omit 37.

6. Average sections cover *First Manual*, VI., and *The Merchant of Venice*.

1-6. **COMPOSITION.** Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's *Julius Cæsar*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, and *Lycidas*; Burke's *Speech on Conciliation with the American Colonies*; Macaulay's *Life of Johnson*, or Carlyle's *Essay on Burns*.

8. **COMPOSITION.** The work is based on Lewis's *Second Manual of Composition*.

9. Shakspeare's *As You Like It*, and *Julius Cæsar*; Bunyan's *The Pilgrim's Progress*, Part I; Goldsmith's *The Deserted Village*; Dickens's *A Tale of Two Cities*; George Eliot's *Silas Marner*; Irving's *The Sketch Book*;

Ruskin's *Sesame and Lilies*; Arnold's *Sohrab and Rustum*; Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*.

10. **RHETORIC AND ENGLISH COMPOSITION.** This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

11. **ENGLISH LITERATURE AND COMPOSITION.** The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPEARE.** Dowden's *Shakspeare Primer*, Hudson's *School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest*.

13. **ENGLISH COMPOSITION.** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, text-books, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Haslitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's *Essays*, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German.

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. The principles of phonetics are presented in simple form, and repeated practice on exercises prepared especially for this purpose is required both in the classroom and in the preparation of the lesson. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. **ELEMENTARY GERMAN.** Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. **ELEMENTARY GERMAN.** Grammar continued. Verb forms emphasized. Easy prose reading.

D. **READINGS IN EASY NARRATIVE PROSE.** Continued drill on grammatical forms. Prose composition based on texts read.

E. **NARRATIVE PROSE AND ONE EASY COMEDY.** Reproductive translation into German. Conversational exercises.

F. **SCHILLER'S WILHELM TELL.** Reproductive translation and independent themes.

G. **SCHWEITZER-SIMONNOT'S Deutsches Lesebuch für Quarta und Tertia.**

H. **GERMAN PROSE COMPOSITION.** Jagemann's or Poll's text-book.

I. **A MODERN NOVEL.** Sudermann's *Frau Sorge* or Freytag's *Soll und Haben*.

1, 2, 3. **ELEMENTARY GERMAN FOR COLLEGE STUDENTS.** Thomas's *Grammar*, Part 1. *Leander's Träumereien*. Schweitzer-Simonnot's *Lesebuch*.

4. **HISTORICAL PROSE.** Ranke's *Kaiserwahl Karls V.* Goethe's *Göts von Berlichingen*.

5. **PROSE COMPOSITION AND THEMES.**

6. **MODERN NOVELS.** Ebner-Eschenbach, Freytag, Sudermann.

7. **SCHILLER.** *Der dreissigjährige Krieg* and *Wallenstein's Lager*.

8. **SCHILLER.** *Die Piccolomini* and *Wallenstein's Tod*.

9. **THE MODERN DRAMA.** Kleist, Grillparzer, Hebbel, Hauptmann Sudermann, Fuld.

French.

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, François.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: *Fraser and Squair* for reference. Reading: *François* and *Giroud's Simple French*. *Sans Famille* (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Eckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), *Muller's Grandes Découvertes Modernes*. Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent résumés and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of the period. Prose; frequent reproductive exercises; letters, business and friendly; twice a week.

6. **MOLIERE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Precieuses Ridicules*. Dictations; abstracts or reproductions from memory of portions of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Polyeucte* (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of L. XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, Bruyère, Madame de Sévigné. Reference work in literature and history. Themes in French.

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYS.** Sainte Beuve, Taine, Brunetière, Le Maître. Themes based on subjects suggested by the reading.

Latin.

The course of study in this department includes, in addition to the four years of training preparatory for college, all the work in Latin as required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the times and with reference to the times and the circumstances under which it lived, and in the more advanced classes attention is paid to the etymology of words.

style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

- 1, 2. **ELEMENTARY LATIN.**
3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulæ Faciles*.
4. **SELECTED FABLES AND STORIES** from Roman history.
- 5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**
- 7, 8. **CICERO, ORATIONS AGAINST CATALINE.** A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.
9. **CICERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in Courses 7 and 8.
10. **VIRGIL, ÆNEID, I., II.** Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.
11. **VIRGIL, ÆNEID, III., IV.**
12. **VIRGIL, ÆNEID, V., VI.** General review. Latin writing.
13. **LIVY.** Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.
14. **HORACE.** Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.
15. **LATIN COMEDY.** Plautus and Terence. *Captivi, Menæchmi, and Phormio.*
16. **TACITUS.** *Agricola, Germania*, and selections from the *Annales*.
17. **PLINY'S LETTERS.** The reading is accompanied by informal talks upon the life, private, social, and political, of Pliny's time. The pictures of the age given by Tacitus, Juvenal, and Pliny are compared and discussed.
18. **JUVENAL'S SATIRES.** Illustrative material of every available sort is used to interpret the text, which is made the occasion of a somewhat detailed study of conditions under Domitian. Collateral readings upon topics suggested by the text and reports on such readings are required of all students. Courses 17 and 18 will be given in alternate years.
19. **LATIN LITERATURE.** Selections furnishing a brief but comprehensive survey of the history of Latin literature from Ennius to the church fathers. Lectures upon Roman life as it affected the development of literary forms.

Decorative Art.

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with *practical methods* in the handling of materials.

in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: turning models for vases in composition, plaster, and clay on the wheel; throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, glazes and underglaze colors; application of underglaze colors and glazes; firing of bisque and glazed ware.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics.

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90 x 40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Evening Session of 1908-1909.

Officers of Administration and Instruction.

OFFICERS OF ADMINISTRATION.

GEORGE NOBLE CARMAN, A. M.
Director.

PHILIP BELL WOODWORTH, B. S., M. E.
Dean of Evening School.

OFFICERS OF INSTRUCTION.

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics.

WARREN RUFUS SMITH, Ph. D.
Professor of Chemistry.

HERBERT EDGAR COBB, A. M.
Professor of Mathematics.

FRED A. ROGERS, B. S.
Assistant Professor of Physics

BENJAMIN JOHN THOMAS, A. M.
Assistant Professor of Mathematics.

JOHN DEK NIES, B. S.
Assistant Professor of Physics.

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS
Instructor in Woodwork.

CHARLES EDGAR HOYT
Instructor in Foundry Work.

WILLIAM PARKER HAWLEY, B. S.
Instructor in Mechanical Drawing.

JOSEPH EDWARD HORA, B. S.
Instructor in Chemistry.

KATHERINE ISABEL INGERSOLL
Instructor in charge of Sewing and Millinery.

HORACE BERNARD MCCABE,
Instructor in Machine Shop Work.

FREDERICK LESTER HAVENS
Instructor in Machine Shop Work.

JUSTIN WYMAN LUDLOW, M. E., C. E.
Instructor in Mechanics.

AGNES BROWN
Instructor in Cookery.

GORDEN CROWELL ABBOTT
Instructor in Machinery Drawing.

BRYANT WHITE, A. B., S. B.
Instructor in Machinery Drawing

ALBERT SIDNEY MERRILL, S. B.
Instructor in Steam Laboratory.

JAY STANLEY JACKSON, A. B.
Instructor in English.

EDWARD C. WINTER
Instructor in Penmanship.

HAROLD HUDSON MORGAN, M. E.
Instructor in Applied Mathematics.

JOSEPH PHIPPIN SHAW
Instructor in Accounting.

WILLIAM G. HOF, M. E.
Instructor in Mechanical Drawing.

CHARLES W. MARTIN, B. S. in C. E.
Instructor in Structural Steel Work.

CLARENCE K. ARP
Instructor in Mechanical Drawing.

MARY KANE
Instructor in Physical Culture.

WILLIAM LANAHAN
Instructor in Steam Practice.

GRACE LUCILE HENNECKE
Assistant in Sewing and Millinery.

WALTER E. BAUERLE

ADOLPH C. H. FENSEHOLT

WILL ORLANDO JACOBI

FRANCIS HOWARD LANE, M. E.
Laboratory Assistants.

General Information.

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, book-keepers, firemen, nurses, stenographers, and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Director and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for a week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 6 to 10 o'clock Monday, Tuesday, Wednesday, and Thursday evenings from October 5 to May 20.

The Library is open from 6 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses.

I. MECHANIC ARTS.

1. Machine Sketching.....	3 terms—Tuesdays and Thursdays.
2. Elementary Mechanical Drawing.....	" " Sec. 1-3, Mon. and Wed.; Sec. 4-6, Tu. and Th.
3. Advanced Mechanical Drawing.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Machinery Drawing.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
5. Patent Office Drawing.....	" " Tuesdays and Thursdays.
6 and 7. Cabinet and Pattern Making.....	3 terms—Tuesdays and Thursdays.
8. Foundry Practice.....	" " Tuesdays and Thursdays.
9 and 10. Machine Tool Work.....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
11 and 12. Gear Cutting, Tool and Die Making....	" " Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.

II. ENGINEERING.

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. and W., 6-8 or 7-9 or 8-10.
4. Electrical Laboratory, Electrical Instruments. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4a. Steam Laboratory, Heat and Work. Tu. and Th., 7.30-9.30.	5a. Steam Laboratory, Boiler and Pump. Tu. and Th., 7.30-9.30.	6a. Steam Laboratory, Steam Engine. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. 10. Tu. and Th., 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. 11. Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. 12. Tu. and Th., 7.30-9.30.
13. Structural Steel Work..... 3 terms—Mondays and Wednesdays.		

III. MATHEMATICS.

1. Arithmetic.....	3 terms—Tuesdays and Thursdays.
2. Accounting and Penmanship.....	" " Tuesdays and Thursdays.
3 and 5. Algebra.....	3 terms—Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Geometry.....	" " Mondays and Wednesdays.
6 and 7. Trigonometry and Analytics.....	" " Tuesdays and Thursdays.
8. Engineering Mathematics First year—Autumn & Winter, Mon. & Wed. Spring, Tues.	
9. Engineering Mathematics Second year—3 terms, Wednesdays or Thursdays.	
10. Engineering Mathematics Third year—3 terms, Mondays.	

IV. CHEMISTRY.

1. Practical Chemistry.....	3 terms—Tuesdays and Thursdays.
2 and 3. Qualitative and Quantitative Analysis.....	" " Tuesdays and Thursdays.

V. DOMESTIC ECONOMY.

1. Cookery.....	Autumn and Winter; Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.
2. Sewing and Millinery.....	3 terms; Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.

VI. ENGLISH.

1. Elementary.....	3 terms—Tuesdays and Thursdays.
2 and 3. Intermediate and Advanced....	" " Int., Tu. and Th.; Adv., Mon. and Wed.

VII. UNIVERSITY EXTENSION LECTURES.

Four Courses of Six Lectures each.....	Thursday evenings, October 1 to March 26.
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Description of Evening Courses.

Mechanic Arts.

1. **MACHINE SKETCHING.** A practical course aiming to assist students in making neat projective and perspective sketches of machine parts. Special attention given to making the sketches complete as regards dimensions, finish marks, and all necessary information with the fewest possible lines and in the shortest time.

2. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

3. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 2 by more practice in machine details.

4. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 2 and 3 and experienced draftsmen.

5. **PATENT OFFICE DRAWING.** The making of clear and effective drawings to meet the requirements of "*Rules of Practice in the United States Patent Office.*"

6. **CABINET MAKING.** For beginners, cabinetmakers, and teachers of manual training.

7. **PATTERN MAKING.** For beginners, patternmakers, and draftsmen.

8. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.

9. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

10. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

11. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

12. **TOOL AND DIE MAKING.** Practice with the lathe, planer, shaper, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making punching, bending, and forming dies and adjusting in punch press.

Engineering.

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms.

Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to use in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY.** Electrical Instrument Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY.** Direct Current Generators and Motors. Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY.** Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector.

5a. **STEAM ENGINEERING.** Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

6a. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

7. **ALTERNATING CURRENTS.** Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. **ALTERNATING CURRENTS.** Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reac-

tances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10. 11. 12. Continuations of 7, 8, 9, respectively.

13. **STRUCTURAL STEEL WORK.** Composition and equilibrium of forces, parallel forces and center of gravity; statics of simple structures. Strength of materials; tension, compression, shear and flexure; ties, columns, beams, rivets, and pins. Structural designs; joints, simple roof truss, plate girder, study of simple bridge, specifications.

Mathematics.

1. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

2. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. **PLANE GEOMETRY**, including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY**, including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permutations and combinations, and the use of four and five place tables of logarithms.

6. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

7. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

8. **ENGINEERING MATHEMATICS.** Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power.

9. **ENGINEERING MATHEMATICS.** Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

10. **ENGINEERING MATHEMATICS.** Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry.

1. **PRACTICAL CHEMISTRY.** The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

2. **QUALITATIVE ANALYSIS.** The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

3. **QUANTITATIVE ANALYSIS.** As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy.

1. **COOKERY.** Practical work in the preparation of food, with the study of the food principles and the effect of heat upon each. Invalid cookery.

2. **SEWING AND MILLINERY.** Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English.

1. **ELEMENTARY ENGLISH:** Composition and Word Study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. **INTERMEDIATE ENGLISH:** Composition and Grammar. Corresponds to elementary English in high schools. Chief object to train the student to compose sentences correctly. Covers the parts of speech, sentence structure, idioms, punctuation, and spelling. Two or more short themes each week.

3. **ADVANCED ENGLISH:** Composition and Rhetoric. Corresponds to advanced English in high schools. Object, to teach the principles of effectiveness in the use of the language and the application of these principles in theme writing. Covers whole compositions, paragraphs, sentences, and words.

Summer Session (1908).

July 6 to August 14.

Officers of Administration and Instruction.

OFFICERS OF ADMINISTRATION

GEORGE NOBLE CARMAN, A. M.
Director.

CHARLES WESLEY MANN, A. M.
Dean of Summer School.

OFFICERS OF INSTRUCTION.

CHARLES WESLEY MANN, A. M.
Professor of History.

FRED A. ROGERS, B. S.
Assistant Professor of Physics.

DUANE STUDLEY, B. S.
Assistant Professor of Mathematics.

BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics.

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS
Instructor in Woodwork.

CHARLES EDGAR HOYT
Instructor in Foundry Work.

EDWARD HERMAN LAY, A. B.
Instructor in Mathematics.

KATHERINE ISABEL INGERSOLL
Instructor in Sewing.

HORACE BERNARD MCCABE
Instructor in Machine Shop Work.

ALPHONSO WIRTH CAVANAUGH
Instructor in Mathematics.

HELMUT BERENS, A. B.
Instructor in German.

JUSTIN WYMAN LUDLOW, M. E., C. E.
Instructor in Mechanics.

GEORGE D. BIRKHOFF, Ph. D.

Instructor in Mathematics.

JAY STANLEY JACKSON, A. B.

Instructor in English.

ROBERT J. KERNER, Ph. D

Instructor in History.

HATTIE C. VANATTA, Ph. B.

Instructor in Latin.

LILLIE F. ABBOTT, A. B.

Instructor in Grade Work.

ZOURA L. CLARK, A. B.

Assistant in Grade Work.

JOHN SMALE, A. B.

Assistant in Grade Work.

MERCEDES KILNER

Assistant in Grade Work.

EDWIN LEMAN

Assistant in Chemistry.

ROBERT BIESEMEIER

Assistant in Forge Work.

General Information.

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.
2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.
3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, covering the work of each year of the high school in English, mathematics, history, and foreign languages.
4. For pupils of the sixth, seventh, and eighth grades of the public school, classes are formed to do the regular work of these grades.

The tuition for the summer term for a course in one subject, five hours a week of class instruction, is five dollars. In Laboratory, drawing, and shop work, ten hours, or a fraction thereof, count as five in determining the tuition.

Preliminary Announcement for Summer of 1909

Mechanic Arts.

1. **MANUAL TRAINING.** Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. **CABINET MAKING.** A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

7. **ELEMENTARY PATTERN MAKING.** Intended for students in Engineering and teachers of Manual Training.

8. **ADVANCED PATTERN MAKING.** Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

9. **FOUNDRY WORK.** The instruction in foundry work is largely individual, the complete equipment of the shop making it possible to give such work as each student desires and needs. One may specialize in cupola and furnace work, in core making, in art bronze and brass work, or in light or heavy machinery molding. Special attention will be given to a course for teachers of manual training.

5. **INSTRUMENTAL DRAWING.** A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. **PROJECTION DRAWING.** Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. **MACHINE DRAWING.** Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing. More advanced machine design will be taught if desired.

20. **MACHINE SHOP PRACTICE.** A course embodying a study of the construction of the different machine tools with instruction in operating and keeping them in order. Practice in centering, plain, taper, and templet turning,

chucking, drilling, boring, external and internal thread cutting; hand tool turning, filing and polishing. Forms of cutting tools, and instruction in grinding. Use of planer, shaper, and universal miller, and grinder; plain milling and cutting of spur and bevel gears.

Mathematics.

1a. ARITHMETIC. An elementary course in preparation for admission to the Institute.

1. ELEMENTARY ALGEBRA. Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. ELEMENTARY ALGEBRA, four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. CONCRETE GEOMETRY, one day a week.

3. ELEMENTARY ALGEBRA, four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. CONCRETE GEOMETRY, one day a week.

4. PLANE GEOMETRY. Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. PLANE GEOMETRY. Circles, ratio and proportion, similar polygons.

6. PLANE GEOMETRY, completed.

10. ADVANCED ALGEBRA. A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. SOLID GEOMETRY. Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. COLLEGE ALGEBRA. Permutations and combinations, limits, convergence of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. PLANE TRIGONOMETRY. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. PLANE ANALYTIC GEOMETRY. Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. CALCULUS. The elements of differential and integral calculus with applications to the integrations most frequently required in engineering subjects.

Physics and Engineering.

A. GENERAL PHYSICS. An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

1. ADVANCED PHYSICS. An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

2. **ELECTRICAL LABORATORY.** The courses in this department will be arranged to suit the individual student.

Chemistry.

All courses are designed to meet, as far as possible, the wants of each student.

- A. **GENERAL CHEMISTRY.** Academy course.
- 1. **GENERAL CHEMISTRY.** College course.
- 4. **QUALITATIVE ANALYSIS.**
- 6. **QUANTITATIVE ANALYSIS.** Analysis of foods, etc.
- 7. **ORGANIC CHEMISTRY.** General laboratory work.

Domestic Economy.

COOKING. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A. **SEWING.** Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

B. **SEWING.** Cutting and making of shirtwaists and wash dresses. Four hours a day.

History.

1a. **UNITED STATES HISTORY.** An elementary course in preparation for admission to the Institute.

- 1. **GREEK HISTORY,** from the Persian wars to the death of Philip of Macedon.
- 2. **ROMAN HISTORY,** from the Punic wars to the death of Caesar.
- 3. **ENGLISH HISTORY,** from the Norman conquest to the present time.
- 4. **UNITED STATES HISTORY.** An advanced course with special attention to the sources and formation of the Constitution, its operation, and the history of political parties.

English.

A. **READING, GRAMMAR, AND COMPOSITION.** A course in elementary English in preparation for admission to the Institute.

- 1. **LITERATURE AND COMPOSITION.** A review of the required English of the first year.
- 4. **LITERATURE AND COMPOSITION.** A review of the required English of the second year.
- 7. **LITERATURE.** The "study-books" required for college entrance in 1909.

[No course corresponding to Course 8 (page 31) will be offered in the summer of 1909.]

- 9. **LITERATURE.** The "reading-books" required for college entrance in 1909.

German and Latin.

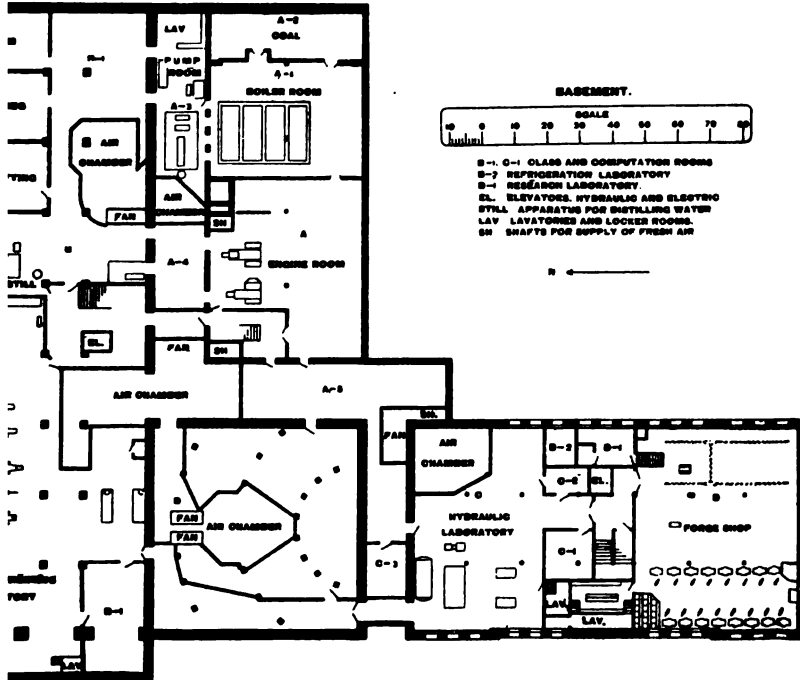
Such elementary classes as may be necessary to meet the demands of the students in attendance.

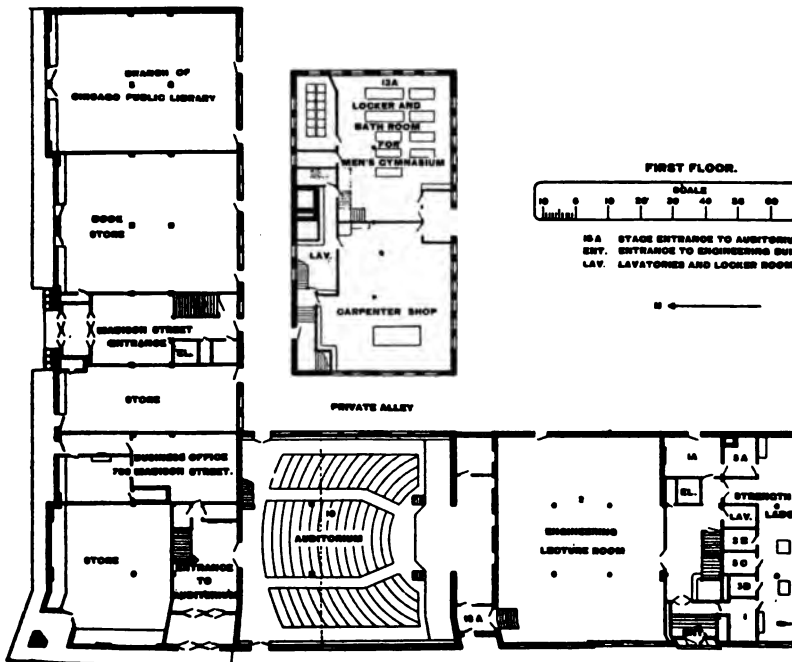
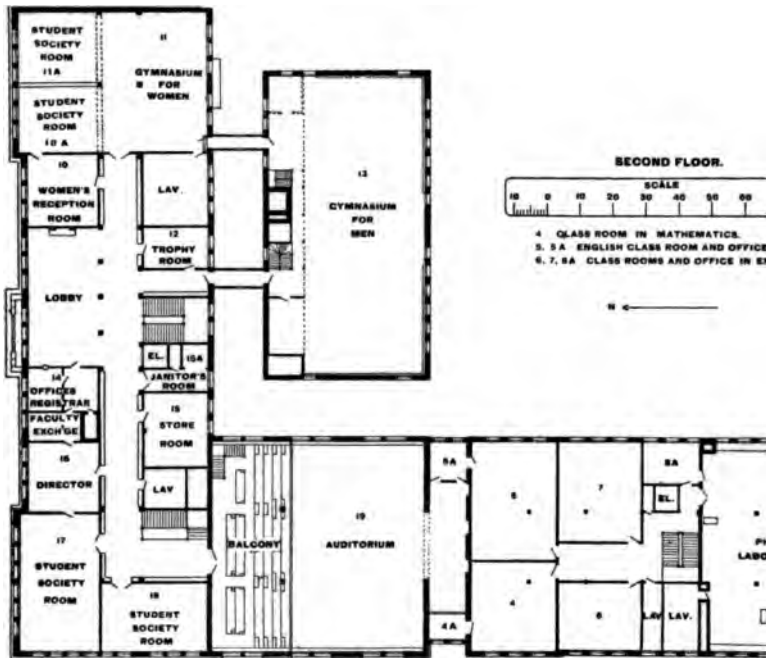
Buildings and Plans.

The buildings are fire-proof structures of brick, sandstone, terra-cotta, and steel, and have been erected at a cost of four hundred thousand dollars for buildings, and one hundred and fifty thousand dollars for equipment.

The Arts Building, at the corner of Madison and Robey streets, is a six-story structure; the Engineering Building, on Robey street, has seven stories; and the Gymnasium, in the rear of the other buildings, has two stories. A high, well-lighted basement occupies the entire space covered by all the buildings and the alleys which separate them.

Both the Engineering and the Arts Buildings are supplied with elevators and the most approved appliances for heating and ventilation, and are equipped with all apparatus needed for the successful accomplishment of the work that has been undertaken.





Laboratories.

The *Dynamo Laboratory* is on the third floor of the engineering building. The equipment includes one 33-kilowatt direct current motor; sixteen direct current motors in sizes up to 5 horse-power; one 35-light arc dynamo; one 30-kilowatt three-phase alternator; one 5-kilowatt two-phase alternator; one 7.5-kilowatt, one 6-kilowatt, and three 5-kilowatt rotary converters, provided with switchboards so arranged that the machines can be operated as plain alternating current or direct current generators or motors, or as converters; two 2-horse-power single-phase induction motors; one 3-horse-power and two 1-horse-power three-phase squirrel-cage motors; one 5-horse-power three phase variable speed induction motor mounted on a cradle dynamometer, and available as an induction motor, generator, or regulator, as a three phase transformer, and as a frequency changer; one 1-horse-power variable speed three-phase induction motor; four 2.5 kilowatt transformers with connections for two-phase three-phase transformation; six 5-kilowatt transformers with a wide range of voltages; one 30,000-volt testing transformer; one constant current series arc transformer with lamps; one constant current arc regulator; a large number of indicating instruments, potential and current transformers, artificial transmission lines, motor compensators, resistances, reactances, condensers, etc.

The *Mechanical Laboratory* is located on the second floor. This laboratory is arranged for work of various kinds. In the equipment are the Reeves variable speed counter-shaft, a Thurston oil tester, a Le Chatelier and a metallic pyrometer, a 6-horse-power gas engine, a 10-kilowatt Kerr steam turbine-generator unit, an Ericsson hot air engine, and gauges, indicators, and other instruments employed in operation and test. The power of this room is supplied by a 20-horse-power electric motor hung on a cradle dynamometer.

The *Strength of Materials Laboratory* occupies one-half of the first floor of the engineering building. This laboratory is equipped to test the physical properties of steel, cement, and other materials of construction. Here are the following testing machines: A 200,000-pound Olsen, a 40,000-pound Riehle, a 1½-inch by 4-foot

Olsen torsion, a Keep dead load, a Keep impact for cast iron, and a 2,000-pound Fairbanks for cement.

The equipment for *Surveying* is kept in the strength of Materials Laboratory. A bank of steel wire lockers contains transits, levels, sextants, compasses, barometers, and other field equipment sufficient for ten parties in surveying.

The *Hydraulic Laboratory* is located in the north end of the basement of the engineering building. It is equipped with weighing, pressure, and weir tanks, rotary and reciprocating pumps, Pelton wheel, hydraulic ram, and the necessary instruments and tools.

The *Steam Laboratory* is located in the basement of the arts building. It is arranged for work in compressed air, ammonia, and steam. Included in its equipment are a 30-horse-power return flue boiler, arranged for natural or induced draft; a 7 by 12 inch Straight Line engine and two smaller experimental engines; a surface condenser; an air and ammonia compressor in connection with a half-ton refrigerating system; two large air tanks capable of withstanding 1,200 pounds pressure per square inch; several makes of steam injectors; water measuring tanks, scales, brakes, indicators, calorimeters, gauges, and other instruments employed in making tests on engines and boilers. For standardizing pressure gauges and indicator springs there is a 50-foot mercury column.

The *Department of Physics* has an especially equipped lecture room with a stereopticon, hydraulic lift, pressure gauges, vacuum gauges, illuminated-dial electrical instruments, and recording hygrometer and thermometer. The lecture table is provided with water, gas, compressed air, steam, vacuum pump, and electricity.

The rooms for the use of the department are: General physics laboratory, departmental library, apparatus and preparation rooms, photometric rooms, private workroom, advanced laboratory, and electrical measurements room. In the advanced physics laboratory each table is provided with slate-lined fuse boxes, from which different currents for use in testing may be obtained. The reference library is supplied with a large assortment of books on the subjects of Physics and Electricity. The photometric room is equipped with Lummer-Brodhun and Flicker photometers, and standard lamps.

The workroom is in charge of a competent mechanic, and is equipped with a drill press, an eight-inch Rivett precision lathe with attachments for milling, grinding, and screw-cutting, a Walker grinder, and numerous hand tools.

The laboratories are fully equipped with apparatus for quantitative work in general physics and electricity. Some of the more recent additions to the outfit for work in light are the following: A Schmidt and Haensch spectrometer, a Schmidt and Haensch polariscope, a Michelson interferometer, and a Newton lecture-room polariscope.

The electrical equipment consists of standards of resistance, capacity, self-induction, and electromotive force; resistance boxes, bridges, galvanometers, and electrometers from Nalder Brothers & Co., Elliott Brothers, and Hartmann & Braun; also dynamometers, voltmeters, and ammeters of various types and ranges. A twelve-inch induction coil furnishes an important part of the equipment. Specially designed switchboards are located in the general physics laboratory and in the advanced laboratory.

The working equipment used for calibration and tests consists of modern commercial machines, such as water motors, water meters, vacuum pumps, hydraulic rams, heat motors, photometers, electric motors, voltmeters, ammeters, recording wattmeters, arc lamps, electric stoves, bridges, condensers, shunts, and discount meters.

The apparatus in the engineering laboratories is also available for use in the department of physics.

The *Department of Chemistry* occupies the west half of the fifth floor of the arts building. The lecture room has a seating capacity of three hundred. The laboratories for general, qualitative, and organic chemistry are equipped with water, gas, and electric current, and contain hoods exhausted by electrically driven fans. The apparatus for the above courses is complete and modern. The quantitative and research laboratories are equipped with all the ordinary apparatus desirable for such work, including Sartorius and Becker balances. They also contain many more complicated pieces, such as combustion, assay, and bomb furnaces, Troemner assay balance, Parr's calorimeter, Junker's gas calorimeter, Brown-ing spectroscopy, Bausch and Lomb microscope, Abbe refractometer, Schmidt and Haensch polariscope, thermostat, Sargent's carbon combustion apparatus, and apparatus for gas and oil analysis and for electrolytic determinations. The supply of chemicals is abundant and varied. The department library includes the best American, English, German, and French reference works and the current American and English periodicals.

The *Geographical and Geological Laboratory* equipment includes the following: A nearly complete set of the topographical atlas sheets of the United States Geological Survey; United States Coast and Goedetic Survey charts and Geological folios; Mississippi and Missouri river charts; pilot charts of the Atlantic and Pacific Oceans; weather maps and charts; relief globe of the earth; relief maps of the continents; relief maps of the United States and of selected localities; collections of common rocks and minerals; several hundred lantern slides; Laing's plantarium, Morse's heliodon, and a four-inch refracting telescope; tables and facilities for molding topographical features; books of reference.

The *Biological Laboratory* has demonstration table with sink and gas supply; laboratory tables with individual lockers; thirteen compound microscopes; sixteen dissecting microscopes; the usual supply of glassware, reagents, etc.; mounted human and animal skeletons; charts; collections of preserved animal and plant specimens and dissections, of microscopic preparations, of lantern slides, of reference books.

The *Bacteriological Laboratory* is furnished with tables having water and gas supply and individual lockers with the usual apparatus; also with incubators, Arnold's sterilizer, hot-air sterilizer, other apparatus, books of reference. The same laboratory contains additional lockers and equipment for the class in household chemistry.

The *Cooking Laboratory* has individual accommodations for classes of sixteen students; a demonstrator's table; and the usual kitchen equipment for cooking and serving in larger quantities.

Shops, Drawing Rooms, Sewing Rooms, etc.

The *Elementary Woodshop* is on the fifth floor of the engineering building and is arranged to accommodate four classes of eighteen each. This shop is for hand work only. The benches are similar to those in the pattern shop, and are equipped with the necessary tools. Seats are arranged so that the students can be given class instruction by practical demonstration and by lectures in which the stereopticon can be used. Special tools and supplies are kept in the tool room. The locker room is arranged with individual lockers. —

The *Wood Turning Shop* is situated between the elementary wood shop and the pattern shop, and is equipped with eighteen lathes of various sizes and makes and the requisite tools and appli —

ances. The lathes are driven by a ten-horse-power motor. Lockers for the students' work are located along one side of the shop. The locker and wash room opens off the shop.

The *Pattern Shop*, on the fifth floor, is arranged to accommodate four classes of sixteen each. It is equipped with eight double benches, each side of a bench having a locker in which the tools used by the students in general are kept, and four locked drawers in which are kept the edged tools used by individual students. The machines in the pattern shop are one 24-inch 12-foot, and three 16-inch 6-foot overhanging spindle lathes; two 12-inch 5-foot, and two 11-inch 4½-foot speed lathes; one 24-inch surface planer; one universal circular cut off and rip saw; one 36-inch band saw; one grindstone; one emery tool grinder; one trimmer, and one sand-papering machine. The band and circular saws and the planer are driven by individual electric motors. The lathes are driven from two line shafts, each of which has an independent motor.

Special tools and supplies are kept in the tool room, and tools are issued to students on check. Conveniently located are a dry kiln and a room in which unfinished work is kept. An office and a class-room open off the shop.

The *Advanced and Elementary Machine Shops* are on the fourth floor and occupy two separate rooms. The shop at the north end of the building is for elementary machine work, and the south shop is for advanced work. Between the two shops and communicating with both is the tool and stock room, where all small tools and supplies are kept.

The equipment of the *Elementary Machine Shop* consists of one 12-inch 5-foot plain engine lathe; one 12-inch 5-foot engine lathe with draw chucks, taper attachment, and compound rest; three 14-inch 6-foot and one 15-inch 6-foot engine lathes, with taper attachments and compound rests; seven 14-inch 6-foot plain engine lathes; two 12-inch 4-foot speed lathes; one 15-inch friction geared shaper; one 16-inch crank shaper; one No. 1½ Universal miller; one 18-inch drill press; one double-wet emery tool grinder; and sixteen vises, placed on a bench running along two sides of the shop. Near the entrance stands a case of small lockers in which the students keep their work and individual tools. The machines in this room are driven by a ten-horse-power electric motor attached to the ceiling.

The *Advanced Machine Shop* is equipped with one 18-inch 12-foot engine lathe, with compound rest; one 26-inch 8-foot, and one

15-inch 6-foot engine lathe, with taper attachments; one 16-inch 8-foot engine lathe, with taper attachment and compound rest; one 14-inch 6-foot toolmakers' lathe, with taper and backing off attachments, compound rest, and draw chucks; one 12-inch 4-foot speed lathe; one No. 3 back geared screw machine, with wire feed; one No. 2 universal miller, with slotting and rack cutting attachments; one No. 3 universal miller, with universal vertical and circular attachments; one 12-inch by 30-inch universal grinder; one 26-inch rack shaper; one 24-inch by 24-inch by 6-foot planer; one 24-inch back-geared drill press; one 13-inch sensitive drill press; one No. 3 inclinable punching press; one combination emery wheel and disc grinder; one wet emery tool grinder; one universal cutter grinder; one circular metal cut-off saw; eight vises placed on wood benches along the walls on two sides of the shop, and three vises on iron benches on the erecting floor and among the machines. All the machines in this shop are driven by independent direct current electric motors, so connected as to give the necessary variations in speed. A one-ton 16-foot hand-power traveling crane, mounted in the center of the shop so that it can traverse the whole width of the building, provides for the handling of heavy work and parts of the machines and tools. In the tool room are kept the general tools and cutter holders belonging to the machines, all the small tools, scales, standard gauges, measuring instruments, supplies, and general stock used in the work of the shops. The tool room is in charge of an attendant, who, by means of the check system, issues tools to students as they are needed in the work. A class room and office open off the shop.

The *Forge Shop*, in the basement of the engineering building, is well lighted by windows on three sides. The equipment consists of one large forge for steam hammer work; one gas tempering forge; one brazing forge; one 200 -pound steam hammer; one angle bender; one eye bender; one bolt header; anvils, forges, and tools for a class of sixteen in ordinary forge work. A 12-foot hand-power traveling crane handles large work for the steam hammer, large forge, and heating furnace. The smoke from the forges is taken away through down draft hoods by a 60-inch steel exhaust fan and the blast is supplied by a 24-inch blower, both of which are driven by a 15-horse power motor. A post drill, a double emery grinder, and a power hack-saw are driven from a separate motor. A stock room and a class room open off the shop.

The *Foundry*, on the sixth floor of the engineering building, is well lighted from skylights in the roof and by windows in the side and end.

The molding floor is made of cedar block placed on end; the floor around the cupola and furnaces is of brick. There are places for sixteen students, each place having a molding floor and a bench, and each bench an equipment of shovel, riddles, rammers, bellows, and molders' small tools.

There is a well equipped core room with two core ovens, one heated by gas for small cores, and the other, 6 feet wide by 10 feet long by 7 feet high, heated by coke and equipped with a car 4 feet wide by 6 feet long. A track for the car runs under the crane for handling large cores and dry-sand molds. There are two permanent and two portable brass furnaces with a combined capacity of 800 pounds, and two cupolas, one a 16-inch, hung on trunnions, and the other, a 24-inch, standing on the floor. A one-ton 16-foot traveling crane with electric hoist covers the main floor of the foundry. The equipment includes a cleaning room with tumbling barrel, and a flask and pattern shop with 12-inch wood lathe. The machinery is driven by a 5-horse-power motor.

A class-room and office open off the foundry. A pattern storage room 20 feet by 60 feet opens off the charging platform. All the equipment with the exception of motors and fan was built in the Institute shops.

The *Rooms for Drawing and Design* are in the engineering building, four on the sixth floor, two on the fifth floor, and one on the fourth floor. They aggregate about five thousand square feet of floor space and are amply lighted and furnished. Their proximity to the foundry, pattern, and machine shops makes it possible to co-ordinate, to an unusual degree, the design and the constructive branches.

The blue-print room is on the mezzanine floor above the sixth, and is approached through a drawing room on the sixth floor. It is equipped with a 40 by 52 inch curved glass blue-print machine, tracing files, and blue-print baths.

On the sixth floor of the Arts Building are ample accommodations with overhead light for the work in freehand drawing.

The *Sewing Rooms* are four in number, situated on the sixth floor of the Arts Building, with overhead light. The largest room has accommodations for sixty students. The machine room is

supplied with ten sewing machines, electric iron, and mirrors and screens for fitting. The millinery room accommodates twenty students, and is furnished with show-cases, models, etc. One of the sewing rooms contains a loom, a spinning wheel, and other apparatus provided for the work in textiles.

Lunch Rooms. There are three lunch rooms. Two of these are on the fifth floor of the Arts Building, adjoining the Cooking Laboratories. Lunch is prepared under the direction of the instructors in cooking, and is served at very reasonable charges. A large room is reserved on the first floor of the engineering building for such men as choose to bring their lunch. In this room only milk, chocolate, and broth can be bought.

Libraries.

The main library consists of about fourteen thousand volumes, and about two thousand pamphlets, selected with immediate reference to the needs of each department. It is essentially a working library, containing all necessary reference works, together with representative books in the various sections of history, biography, literature, fine arts, engineering, mathematics, philosophy, philology, and sociology. There are special libraries connected with the class-rooms in physics and chemistry. One hundred and sixty-three periodicals are currently received.

Throughout the school year the libraries are open from eight A. M. to five P. M.; during the session of the night school the hour for closing is nine P. M. The students at all times have free access to the shelves. Library assistants serve in turn at the reference desk and assist in making the students familiar with the arrangement of the books and the use of the dictionary catalogue. The catalogue is a clear, simple guide to the resources of the library, free from confusing technicalities. The Dewey system of classification is used, with Cutter book numbers.

Students in Attendance, 1907-8.

The names of students taking evening or summer courses are not included in these lists.

College Students.

The figures after the names indicate the number of courses of instruction completed without conditions at the close of the year ending in June, 1908, above and beyond the fifteen admission units.

Engineering College Students.

Adams, Charles Webster.....	36	Gibson, Ralph Andrew.....	10
Adams, Clyde.....	22	Godwin, Robert Franklin.....	9
Ahrens, Walter Robert.....	13	Golden, Walter.....	2
Allan, William Selby.....	18	Goldsmith, Roy Douglas.....	6
Anderson, Wilbur Clarence.....		Goss, LeRoy.....	25
Arp, Clarence.....	20	Hall, John.....	36
Atwater, Harry.....	3	Harris, Charles.....	8
Aurand, Arthur Guy.....	6	Harvey, Arthur Homer.....	21
Bacon, Malcolm.....	3	Hauber, Clemens.....	15
Bang, Homer William.....	24	Havens, Fred.....	30
Barber, Robin Henin.....		Heath, William Clarkson.....	10
Baron, Edward Everett.....	6	Hill, Vernon Orville.....	9
Bartik, Edward.....	6	Hoadley, George Lee.....	20
Bassett, Cyrus White.....	15	Hodges, Albert.....	20
Bauerle, Robert.....	3	Jacobi, Will Olando.....	20
Bergmann, Ernest.....	36	*Johnson, Forbes.....	7
Biesemeier, Robert Frederick.....		Johnson, George A.....	
Bloss, Eugene.....	15	Jordan, Irving.....	27
Booth, Frank Harold.....	3	Kaindl, Arthur.....	22
Brand, Paul.....	13	Kaiser, Everett Dae.....	9
Brickwood, Blaine Jackson.....	17	Kane, Paul.....	12
Burke, Harry James.....	12	Kenny, John.....	9
Bush, George Chester.....	9	Kidder, Wal ter.....	22
Carpenter, Charles Irving.....	22	Kilner, Ralph Hammond.....	30
Chariton, James.....	3	Klamt, Edward.....	3
Coda, Charles Anthony.....	3	Klein, William.....	11
Cohn, David.....	36	Koelling, Adolph, Jr.....	13
Curtis, Arthur John Ramage.....	21	Kohout, Jerome.....	10
Datta, Joges Chandra.....		Kuehne, Alfred.....	27
De Graw, Orley Andrew.....	15	Leman, Edwin.....	9
Dempsey, Ewald.....	6	Libberton, Jesse Herbert.....	36
Dieckman, Albert.....	36	Libbey, Herbert.....	36
Dohnal, Ignaz.....	10	Loeding, George.....	12
Dorzeski, Victor.....	6	Long, Arthur Morris.....	18
Dykstra, John Edward.....		Luhr, Wesley Edward.....	
Etnyre, George Mortimer.....	12	Martin, Edward Paul.....	24
Feely, Frank.....	6	McDaniels, Frank Leslie.....	36
Filkins, Earl.....	24	McGrath, John Daily.....	9
Ford, John Gerard.....	12	Meisner, George Anthony.....	2
Forster, Henry.....	10		

*Deceased.

Merrill, Howard Nichols.....		Shewmon, Dan Dimmitt.....	1
Mettenet, Francis Xavier.....	14	Siebel, Emil.....	2
Moore, Roy Stehman.....	26	Skiles, Frank Chambers.....	3
Morgan, Edward.....	38	Skooglund, David.....	3
Muench, George William.....	36	Slaughter, William Bristol.....	1
Myers, Frank Edward.....	12	Small, Elmer Stiles.....	1
Nicholl, Ellis Hudleston.....	13	Smith, Edward.....	2
Nickelson, Robert Theodore.....	6	Stone, Porter Edward.....	2
Obergfell, Ralph Marshall.....	12	Strauss, Edward Emil.....	
Pardee, Theron.....	6	Summerhays, Elmer Moore.....	
Parker, Vilas.....	18	Sumkowski, Alfons Julius.....	
Perlow, Arthur Raymond.....	22	Sykes, Grover.....	
Peterson, Harvey Emanuel.....	15	Thompson, Roy.....	
Phelps, Edwin Philbrook.....		Tull, Mark Eugene.....	
Rafferty, James.....	36	Uhlhorn, Walter.....	
Reger, John.....		Wade, Frank Harison.....	
Reisenhus, James Arthur.....	3	Walker, Fred Gale.....	
Riddell, Murray.....	14	Wallace, John Dwyer.....	
Robinson, Pratt.....	9	Weil, Henry Teller.....	
Schaedel, Victor Emil.....		Whitehead, Richard Henry.....	
Schrader, Paul.....		Wolf, William John.....	
Seyferlich, Edgar Philipp.....	6	Wyman, Lawrence West.....	
Shalek, Raymond Francis.....	9	Zielaskowski, John.....	
Sharp, Augustus William.....	20	Zitzewitz, Walter.....	
Sherman, Oren Gray.....	30		

Science and Arts College Students.

Alderman, Merle.....	4	Gansbergen, Marguerite Elizabeth.....	1
Alexander, Edward.....	3	Gaynor, Kathleen Marie.....	1
Alexander, Walter.....	2	Gill, Nelle.....	2
Anderson, Agnes.....	20	Gleason, Pauline.....	1
Batchelder, Edith Pottle.....	18	Glos, Albert Henry.....	1
Bentley, Mabel Clara.....	18	Goodman, May Isabella.....	1
Bergmann, Adele.....	21	Green, Annie Isabel.....	15
Bicknell, Clarence Scott.....	2	Green, Irene.....	1
Brickwood, Beatrice Marguerite.....	28	Gunthorp, Martha Jane.....	41
Bryan, Marie.....	2	Hackshaw, Hazel.....	7
Butcher, Fannie Amanda.....	18	Hewett, Edith Adelia.....	8
Carey, Rose Marie.....	9	Holden, Grace.....	18
Carnes, Portia.....	27	Hood, Grace.....	27
Cohen, Bernhard.....	3	Hooper, Mildred.....	18
Coonley, Edith Gertrude.....	18	Hubbell, Jennie Irene.....	18
Corbin, Louise Mirrah.....	10	Jensen, Katherine.....	1
Corkell, Delphine Zarilda.....	12	Jones, Alice Lloyd.....	11
Cunningham, Martha Isabella.....	18	Kammerling, Edith.....	18
Davis, Nellie Helene.....	10	Keeler, Anna Estelle.....	11
Davis, Sarah Mabel.....	10	Keirnan, Marie Josephine.....	1
Dick, Rhoda Ellen.....	12	Kemnitz, Arthur.....	2
Dimmitt, Margaret Beatrice.....	7	Kilner, Mercedes.....	11
Docker, Edith May.....	10	King, Ethel.....	11
Downing, Helen Nancy.....	10	Kinney, Frances Edna.....	1
Dreffein, Robert.....	6	Kubitz, Edna Adelaide.....	1
Farrell, Grace Leone.....	16	La Due, Ethel Irene.....	1
Fitts, Maygene.....	9	Langworthy, Rose (Mrs.).....	1
Forster, Ilse Maya.....	9	Lugsdin, Louise Brookes.....	1
Froelich, Crissie Mae.....	9	Lyons, Maud May.....	1

as Hanna.....	8	Schueler, Mabelle Catherine.....	18
ta.....	8	Schutz, Dorothy Leah.....	6
i Louise.....	8	Scott, Mildred Alice.....	18
Elizabeth.....	22	Shafer, Etta Mary.....	20
n Agnes.....	19	Sherfy, Alice Titsworth.....	18
e Dorothy.....	15	Shurick, Amy.....	18
nce James.....	6	Smith, Anna Elizabeth.....	19
Luella.....	6	Smith, Hobart Predmore.....	18
elle Northway.....	5	Smyth, Sarah Angela.....	29
n.....	28	Spencer, Florence.....	5
izabeth.....	10	Spencer, May Sarah.....	10
gnes.....	3	Stavers, Mildred Evelyn.....	18
.....	4	Stokes, Mildred Louise.....	14
.....	6	Stubings, Ruth Victoria.....	8
er Freeman.....	6	Swanson, Joseph Nathanael.....	18
fr.....	18	Szmergalski, Theodore.....	18
red.....	18	Towne, Elizabeth Fargo.....	26
lliam.....	6	Turnbull, Florence.....	9
linnie.....	3	Waid, Winnie Elsie.....	9
.....	20	Wathier, Frances Mary.....	28
allantyne.....	9	Weismer, Ulmer Valencia.....	7
Hannah.....	10	Wells, Sarah Cecilia.....	11
.....	8	Weyand, Louise Anna.....	10
ria.....	3	White, Mabel Frances.....	9
arie.....	18	Wight, Ruby May.....	10
thryn.....	9	Williams, Laura Angela.....	18
l.....	6	Winkelman, Laura.....	9
.....	18	Winkler, Edith Edna.....	6
rence.....	2	Winkler, Elsa Margaret.....	6
rey.....	19	Wolcott, Zoe.....	18
ra.....	1	Wood, Helen Gale.....	9
Preston.....	11	Worthington, Miriam.....	15
ide.....	18	Wright, Dorothy Anne.....	11
.....	9	Wright, Marjorie Jane.....	11
		Wylie, Beulah Edna.....	9
		Yaxley, Leona Delia.....	9

Unclassified College Students.

ouise	Gottfried, Duraine
uise	Hampton, Edward Cowles
t	Harrington, Ralph Gay
n	Harrison, Grover
William	Hinkley, Josephine (Mrs.)
n	Hubbard, Gertrude Ayer
l Oscar	Juhnke, Mary
John	Kinsey, Mable (Mrs.)
	Landes, Joseph
n	Leland, May Noyes (Mrs.)
Llewellyn	Lines, Gladys
d	Manning, Clarence Edward
uise	Martin, Verna Kirk
Myer	McDonald, Anna
ic Sydney	McGrath, John Daily
	Moyle, Bennet
	Niederman, Malvina Dorothy
	Ochs, Arthur John

Ritchie, Prescott
 Roberts, Edith
 Robinson, Myra
 Rosenberger, Ella
 Rubenstein, Joseph
 Ryan, Florence Irene
 Sandberg, Anna
 Schultz, Deo (Mrs.)
 Scollay, Robert James
 Sharp, Lou Charlene
 Slagle, John Herbert
 Souhan, Ella

Speed, Louise Marie
 Stoddard, Nina Lovejoy
 Tedman, Hudson Alva
 Teegarden, Charles William
 Todd, Edwin William
 Tyler, Dorothea
 Ufer, Mary (Mrs.)
 Walker, Clifton
 Warner, John
 Wheeler, Raymond
 Wodetzky, Maud
 Wood, Veda Palmer

Academy Students.

The figures after the names indicate the number of units completed at the close of the year ending in June, 1908. For definition of units see

Aarvold, Oscar Olson.....		Birdsall, Elsie.....	
Abbott, Arthur William.....	15	Birkhoff, David.....	
Abbott, Loraine Ethel.....	3	Birkhoff, Gertrude.....	
Abram, Milton.....	6	Birmingham, Frank.....	
Ackerman, William Frederick		Blackman, Gladys.....	
Daniel.....	8	Blanding, George Harvey.	
Adams, Elmer Edwin.....	6	Blish, Russell.....	
Alley, Whitfield Hooker.....	7	Bocher, Main Rosseau....	
Alling, Clyde Richard.....	2	Bomash, Lillian Beatrice..	
Allyn Hosmer Holland.....	4	Borg, Anna.....	
Anderson, Andrew John Albert..	7	Boulton, Florence Edith..	
Anderson, Eliza Adess.....	3	Bowes, Lawrence Cecil....	
Anderson, Leroy Christ.....	3	Branand, Edmond Richard	
Antonisen, Arthur.....	10	Breckan, Harris.....	
Arnold, Zella Bildersback.....	12	Brenton, Robert Redfield..	
Arzt, George Edward.....	7	Brett, Florence Caroline...	
Astrup, Jennie.....	4	Breyer, Charles Conrad, Jr	
Aufrecht, William.....	10	Brill, John Leonard.....	
Baggott, Russell Lewis.....	12	Brough, William Ronald...	
Bain, Foree, Jr.....	2	Brown, Cecil Aunger.....	
Baldwin, Raymond.....	8	Brown, Sherwood Eklund..	
Baldwin, Ruth.....	4	Burmester, Leroy.....	
Balis, Walker Jones.....	5	Burns, Howard Fletcher..	
Ball, Clyde Elmer.....	3	Burnham, Constance.....	
Bannister, Harold.....	15	Burroughs, Studley Oldham	
Baragwanath, Genevieve.....	12	Bushspies, Hazel Marie...	
Baragwanath, Ruth.....	3	Busse, Walter Henry.....	
Barler, Richard Candon.....	4	Bye, Herbert William.....	
Barr, Marjorie.....	10	Byers, Edith Philinda....	
Bartelme, Clarence Michael....	6	Campbell, David Shonts...	
Bartik, Charles.....	11	Campbell, Stuart MacMurr	
Barton, Lucy Adalade.....	11	Carden, John Joseph.....	
Beachy, Walter Fahrney.....	3	Carey, Charles Henry.....	
Becker, Albert Raymond.....	8	Carqueville, Charles.....	
Beggs, Gertrude Elizabeth.....	12	Chamberlain, Thomas Irvin	
Benedict, Lloyd George.....	11	Childs, Leslie Oliver.....	
Bennett, Fern.....		Chileski, Paul.....	
Besse, Arthur Henry.....	3	Chiville, Leslie Lenox....	
Bilek, Joseph.....	8	Chmelik, Frank Joseph....	
Bilster, Halsey Carl.....	7	Christiansen, Albert Charle	

STUDENTS IN ATTENDANCE.

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Churchill, Amos, Jr.....	2	Enger, Dorothy Helen.....	10
Clasen, Herman.....	10	Ericksen, Ruth.....	4
Cleaves, Hazel Beatrice.....	4	Estrin, Emil.....	3
Clenny, Helen.....	10	Faherty, Edward.....	2
Clough, Kendrick Harvey.....	9	Fee, Wallace McGregor.....	
Cohen, Elsa.....	7	Fehlman, Martin Stempel.....	4
Cohn, Julius Wilson.....	6	Fekete, Joseph.....	3
Colburn, Jewett Adelbert.....	10	Filip, Ignac Stanislaus.....	15
Collier, Helen Beatrice.....	10	Findeisen, Charles Walter.....	7
Condit, Harold Scribner.....	4	Flanagan, Arthur Joseph.....	8
Conley, John Patrick.....	3	Florsheim, Miriam.....	
Conlon, Leo Lawrence.....	8	Foley, Alexander.....	10
Cook, Querin Henry.....	4	Foley, Juliet May.....	
Coonley, George Theron.....	5	Foote, Harry Aloysius.....	2
Corliss, John Lester.....	8	Fox, Russell.....	9
Corrigan, Arthur James.....	3	Frank, Maurice.....	6
Corrin, Richard.....	15	Franklin, Muriel.....	13
Cox, Arthur.....	4	Franzen, Hulda.....	6
Cox, Martha Emmeline.....	15	Franzen, Erwin Henry.....	3
Crafton, Helge Rudolph.....	4	Franzen, William Fred, Jr.....	4
Crane, Walter James.....		Freilich, Ellis Benjamin.....	13
Cravens, Ben Harrison.....	4	Fruehling, Charles Frederick.....	3
Cravens, Worth Townsend.....	8	Fuchs, Margarite.....	8
Crego, Ralph Emerson.....	3	Fuerman, Mabel.....	5
Cremar, Henry August.....	4	Fuerst, Philip.....	3
Crile, Dennis Rider Wood.....	12	Furst, Gertrude Lydia.....	6
Curtiss, Rex Charles.....	12	Gamble, Celia Martin.....	9
Czapler, Max.....	6	Gamble, Merritt Campbell.....	5
Dabbert, George.....	7	Garcia, Juan.....	9
Dale, David.....	9	Gascoigne, Frederick Clements.....	2
Davey, Doris Alice.....	15	Genslein, William Gustave.....	4
Davidson, Isabelle.....	11	Gilberg, Lester Emil.....	2
Davies, Glenn Harrison.....	9	Gillmore, Ruth Marjorie.....	4
Davis, Paul Newhall.....	5	Glidden, Benjamin Wilmarth.....	5
Degenhardt, Edna Marie.....	2	Goehrs, Irving August.....	8
de Jong, Carroll Stone.....	10	Goit, Alexander Clinton.....	10
Dennis, William Clark.....	8	Goit, Lawrence Edward.....	8
Dickinson, Fred.....	13	Golden, Howard.....	4
Dickson, Cyril Bernard.....	10	Goodall, Thomas Jefferson.....	4
Diederichs, Leo Otto.....	3	Gould, Anna.....	1
Diederichs, Paul Otto.....	3	Gould, Joseph William.....	5
Dietrich, John.....		Gramse, Albert Fred.....	3
Dodge, James Augustus.....	6	Graue, Milton Henry.....	3
Dodge, Louie Burton.....	10	Gray, Marian Ethel.....	4
Dodge, Raymond.....	11	Gruenfeld, Julius.....	8
Doetsch, Oscar Philip.....	8	Gunderson, Gladys.....	9
Doheny, Harold James.....	7	Hagemann, Ernest.....	9
Doktorsky, Philip.....	10	Haines, Thomas Lloyd.....	15
Donaldson, Jacob Crawford.....	15	Hall, Albert.....	
Dorman, Beth M.....	11	Hannan, Helen Adelaide.....	15
Drake, Irene Emily.....	3	Hansen, Henry Nicholas.....	10
Drews, Hedwig Augusta.....	3	Hansen, James Berger.....	10
Dunn, Fred David.....	15	Hansen, Merritt Rasmus.....	12
Dyson, George Egbert, Jr.....	4	Hansen, Walter Harry.....	3
Edstrom, Edward.....	8	Hapeman, Clark Mac.....	4
Ehrhardt, Alwin William.....	11	Hardy, Maurice.....	6
Eichelman, William Harold.....	4	Harris, Christine.....	8
Eldred, Warren.....	15	Harris, George.....	7
Eldredge, William Strickland.....	9	Harris, Nancy.....	15

Harris, Raymond Adelbert.....	4	Juhnke, Leokadia Matilda.....	9
Haskin, Charlton Charles.....	3	Kase, Henry Michael.....	4
Haskin, Hazel Florence.....	4	Kazda, Charles Bohumel.....	15
Haskins, Dorothy Margaret.....	11	Kehm, Walter Gilbert.....	4
Hathaway, Fanchon Helen.....	15	Kelly, William James.....	4
Hautau, Emma.....	12	Kendrick, Isabel Street.....	4
Hazelton, Frank Benjamin.....	2	Kietzer, Waldemar Weimar.....	13
Hazlewood, Paul Joseph.....	9	Kimbell, Arthur.....	15
Healy, Claude Sprague.....	15	Kinny Charles.....	7
Hedman, Herbert.....	15	Kipp, Fred.....	11
Heffron, Arthur.....	12	Kirby, Frank Irving.....	9
Heffron, Helen.....	7	Kistenbroker, Irma Henrietta.....	8
Heggie, Barbara Frances.....	3	Kniffen, Chester Warren.....	15
Hepp, Emil.....	6	Knoch, Marie Johanna.....	7
Herle, Frank Leonard.....	4	Knoll, Robert.....	10
Herrick, Helen Powers.....	11	Knox, Florence.....	7
Herrmann, Leon Charles.....	6	Koester, Clara.....	3
Hess, Charleton White.....	8	Kolacek, William John.....	3
Heywood, Harold William.....	7	Kooi, Doris Elaine.....	4
Hibbard, Charles Alexander.....	3	Kooi, Vera Mae.....	8
Hildebrandt, Edward.....	4	Koop, Marguerite Emily.....	8
Hildebrandt, George.....	15	Kornbrod, Joseph.....	7
Hill, Frederick Alfred, Jr.....	11	Korup, Dora.....	8
Hobler, Fred Otto.....	4	Korup, Theresa.....	4
Hochstaedter, Benjamin.....	10	Kramer, Frank Joseph.....	9
Hoffman, Clara Louise.....	13	Kratzenstein, Louis.....	10
Holden, Katharine Marion.....	15	Kreuter, William.....	3
Holden, William Henry.....	4	Kroeschell, Carl Herman.....	13
Hood, Clara Louise.....	15	Kroeschell, Paul Herman.....	4
Hotchkiss, Allita Frances.....	4	Kuester, George Carl.....	5
Howe, Ruth Elizabeth.....	4	Kupsch, Arno Walter.....	4
Hoyt, William Pritchard.....	3	Labahn, Albert.....	4
Hunter, Dundas.....	15	Labahn, Charles John.....	8
Huszagh, Victor Lee.....	15	Lammert, Olive Madeleine.....	4
Ilett, Dorothy.....	7	Lamoureux, Rene.....	8
Ilett, Marie.....	11	Lane, Marie Ruth.....	4
Jacobsen, Inger Amala.....	15	Lane, James Warren.....	6
Jacobsen, Jennie Charlotte.....	15	Larsen, Elmer Carl.....	13
Jandus, Robert Cyril.....	10	Larsen, Reginald Lester.....	10
Jenkins, Edna May.....	1	Lassen, Knud Wildfang.....	3
Jenkins, Ralph Mathers.....	9	Lay, Landon Sebastian.....	5
Jensen, Edward.....	5	Layman, Kenneth Foss.....	10
Jensen, Kay Einer.....	5	Ledgerwood, Helen Clara.....	8
Jessup, Carl Justus.....	3	Lehle, William Louis.....	10
Jevne, Verna Alice.....	4	Lehmkuhl, Paul August.....	4
Johnson, Arthur Clarence.....	7	Leininger, Luther.....	4
Johnson, Carl.....	4	Levin, Charles.....	3
Johnson, Carl Edward.....	6	Levit, Hazel Eunice.....	2
Johnson, Ernest.....	6	Levy, Flora.....	2
Johnson, Louis Ely.....	6	Lewis, Vernon Allen.....	2
Johnson, Marshall Chase.....	11	Lindelsee, Leonora.....	4
Johnson, Robert Ulyses.....	10	Lindholm, Irving.....	9
Johnson, Ruth Margaret.....	2	Lindquist, Elmer Washburn.....	6
Johnston, Anita Edith.....	4	Lindroth, Janet.....	4
Johnstone, Walter Knox.....	15	Lineham, Alberta Louise.....	4
Jones, Ethel Grace.....	8	Lister, Everett Alfred.....	15
Jones, Irene Jennie.....	7	Loeding, Sophie.....	15
Jones, Warren Gilman.....	11	Lorenzen, William.....	15
Juergens, Ada.....	11	Loring, Elsie Brown.....	15

STUDENTS IN ATTENDANCE

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Hodge.....	9	Nelson, Marie Josephine.....	10
Jeffer.....	3	Netter, Mary.....	3
Jethel.....	4	Neumann, Francis Nicholas.....	4
Frederick.....	8	Newell, Laurence Plympton.....	3
Liam.....	4	Nielsen, Elker Rosehill.....	3
Stephen.....	4	Nieman, Byron Weasa.....	8
und William.....	7	Nilson, Arthur.....	3
Jr.....	6	Noll, Gertrude.....	3
.....	4	Novak, Otto Edward.....	3
.....	11	O'Brien, George Francis.....	6
dson.....	8	O'Brien, Janet.....	15
Ridpath.....	8	O'Brien, Ruth Catherine.....	8
is.....	11	Oestermann, Ethel Marie.....	7
Rheinhold.....	8	Ogden, David Batchelder.....	6
nd Edward.....	3	Ogden, Marie.....	5
illington.....	3	Olds, Grover Edwin.....	5
ackett.....	8	Olson, Oliver Opheim.....	3
.....	3	O'Neill, Eugene.....	3
.....	13	*Palamaris, Constantine.....	9
Andrew.....	8	Parkhurst, Perry Claude.....	8
Henry Gottlieb.....	2	Parks, Clarence Runyan.....	8
d George.....	4	Parsley, Nannie Nutt.....	3
.....	6	Peake, Frederick Burbank.....	11
Edward.....	2	Pearse, Harold.....	4
nd.....	14	Pearse, Mabel Katherine.....	8
wart.....	9	Perrill, Alger.....	10
Alan.....	8	Petersen, Clara Marie.....	3
Marie.....	10	Petersen, Theodore Waldemar.....	12
Henry.....	7	Peterson, Arthur Axel.....	1
lph.....	2	Peterson, Dagmar Marie.....	3
ence.....	4	Peterson, Elmer Leroy.....	15
a Caroline.....	11	Peterson, Harold.....	3
Hughes.....	15	Peterson, Harry Cornelius.....	5
ce.....	9	Petrie, Gertrude.....	2
helan.....	15	Phillipson, Emanuel.....	2
.....	3	Phillis, Joy Adele.....	6
.....	5	Phimister, Orrin Potter.....	15
aine.....	11	Pierce, Cornelia.....	9
.....	2	Pierce, Irving Harry.....	11
.....	4	Pihlfeldt, Bergliot Edna.....	3
John.....	3	Pilat, Gertrude Helen.....	15
omas.....	3	Pincoffs, Edmund.....	2
.....	4	Pollitz, Fred Joseph.....	6
arpenter.....	13	Porter, Edwin Margraff.....	15
d Landis.....	9	Powers, Earl Warren.....	10
.....	15	Powers, William Francis.....	7
yton.....	8	Preston, William Douglas.....	10
Harper.....	8	Price, William Henry.....	3
t Lewis.....	10	Prindiville, Louis Ashfield.....	15
mily.....	3	Puster, Dumas Eugene.....	15
.....	2	Puster, John Harold.....	8
ed.....	15	Puster, Margaret Emrich.....	15
h Wayne.....	12	Quayle, Clara Elizabeth.....	11
ian.....	2	Radnitzen, Adolph.....	9
.....	9	Raithel, Andrew George.....	2
uise.....	3	Raithel, Lillian Sophie.....	13
andolph.....	15	Raymer, Alice.....	4
lowell.....	5	Raymer, Ellen.....	
delbert.....	3		

*Deceased.

Rayspis, James Thomas.....	10	Simons, Erskine Phelps.....	10
Reed, Albert Earl.....		Sitkin, Rosa Romiana.....	
Rehm, Arthur William.....	2	Smith, Harold Kellogg.....	8
Reich, Paul.....		Smith, Helen.....	4
Reichel, Albert Sunderland.....	6	Snyder, Clifford Walter.....	10
Reinhard, John Adam.....		Snyder, Homer Virgil.....	8
Reinhardt, Charles Henry.....	6	Soelke, Elsa Dorothy.....	11
Reininga, Henry.....	15	Soest, Alfred August.....	2
Renschler, Evalynne.....	9	Soest, Martha Lydia.....	2
Rhodes, Margaret.....	6	Sommerfield, Nate.....	11
Rich, Herbert Todd.....	10	South, Donald Corbly.....	11
Richards, Marnet Austin.....	4	Spies, Philip Matthew.....	10
Richter, William Henry Charles..	9	Springer, Walter William.....	9
Riley, Donald Harrison Barnett..	15	Stach, Walter Martin.....	3
Robertson, George Percival.....	13	Stanger, Herbert Theodore.....	4
Robinson, John Laurence.....	15	Stark, Frank Bernard.....	11
Robinson, Raymond Dudley.....	4	Stearns, Richard Irving.....	15
Roeschlaub, Genevieve Sharer...	4	Stein, Milton Washington.....	15
Rogers, Frank Ely.....	12	Stein, Sol.....	2
Rojahn, Edna Alberta.....	9	Stephens, Harold Alfred.....	8
Rosche, George Edward.....		Stevenson, David Robert.....	3
Rose, Harold Emanuel.....	4	Stewart, George Ross.....	4
Rose, Waldo John Albert.....	12	Stieber, Joe.....	4
Ross, Harold McBain.....	4	Stoddard, Edward Woodhall....	11
Rosseland, Frederick Martin.....	11	Street, Helen Delia.....	12
Roth, Ella Margarite.....		Street, Lloyd Gilbert.....	15
Roth, Helen.....	15	Strickland, Robert Tiras.....	7
Roth, Walter Sherman.....	5	Swanson, Charles.....	4
Royer, Harry.....	7	Swenson, John Henry.....	10
Rubenstein, Nathan.....	10	Taggart, Harry.....	4
Russell, Emerson.....	15	Tarracciano, Alexander.....	5
Russell, John Kent.....	7	Taylor, Forrest Charles.....	2
Rutherford, John Joseph.....	8	Taylor, Hazel Emma.....	11
Ryther, Henry White.....	9	Tehle, Charles John.....	7
Sailor, Helen.....	15	Templeton, Kenneth Stuart.....	10
Salisbury, Howard Darius.....	12	Thoma, Edward Gustave.....	4
Samels, Edgar.....	11	Thomas, Edwin Benjamin.....	4
Samuel, Rose Ida.....	1	Thomas, Patrice Jessie.....	5
Sanders, Henry August.....	4	Thompson, Walter Thomas.....	5
Sands, John.....	15	Thomson, Earl Sanderson.....	4
Sauer, Joseph.....	7	Timberlake, Erwin Bateman....	15
Savage, George Edward.....	4	Titus, Harold Earle.....	12
Saxe, Edward Goodwin.....	6	Titus, Robert Virgil.....	15
Saxon, James Christian.....	9	Toban, Frank.....	8
Schafer, Fred Otto.....	15	Tope, William Arthur, Jr.....	2
Scheuer, Walter.....	9	Torgerson, Edward Fritchhoff..	11
Schlund, Fred James.....		Torrison, Margaret Agathe.....	7
Schmidt, Nell May.....	8	Travis, Lawrence Le Valley.....	12
Schrader, John Herman.....	8	Troyke, Louis.....	9
Schroeder, Edgar Herbert.....	8	Tuohy, Paul.....	4
Schroeder, Louise Marie.....	3	Turner, Charles Arthur.....	8
Schroer, Elsa Augusta.....	5	Ullrick, Helen May.....	15
Schultz, Esleigh Ernst.....	8	Vavrinek, Edward Joseph.....	7
Schwartz, Samuel.....	8	Verkoulén, Frank Hubert.....	5
Scott, Charles Edward.....	7	Vivian, Glenn Fish.....	9
Seneco, Roy Eugene.....	10	Vockel, Clarence.....	10
Sheardown, Rex Winton.....	11	Vogt, Henry Victor.....	4
Shopera, Henry Nathan.....	3	Vogt, Joseph.....	11
Siegel, Ruth Irene.....		Volberding, Harry Henry.....	8

STUDENTS IN ATTENDANCE.

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d.....	13	White, William Albert.....	15
is.....	8	Whitney, Mabel.....	4
ight, Oscar Pearl.....	2	Wieneke, Clarence.....	15
Elsbeth Beatrice.....	10	Wilder, Paul.....	15
nold Spencer.....	12	Williams, Andrew.....	11
hard Webster.....	7	Williams, Edith Florence.....	5
Philip.....	15	Williams, Margaret Florence.....	11
Charles Brock.....	7	Wilson, Oscar James.....	8
dae Elizabeth.....	9	Wilson, Stuart James.....	4
omas Edgar.....		Winberg, Henry Edward.....	2
linor.....	4	Wise, Frank John.....	7
Albert Philip.....	10	Wishart, Harold William.....	2
Ferdinand Walter.....	2	Wolff, Benjamin.....	11
a.....		Wolfson, Ida.....	4
t, Walter Ralph.....	4	Wright, Georger Reed, Jr.....	7
Lottie Marie.....	2	Wyre, Dwight Emwrest.....	15
therine.....	8	Yaxley, William Ernest.....	7
Leon Frederick.....	2	Zielaskowski, Frank.....	11
Mildred Storey.....	11	Zimmerling, Cora Leonor.....	6
lmer Roy.....		Zuetell, Edison Leidvelt.....	2

Unclassified Academy Students.

Boys.

Benjamin	Dummer, James Byron
seph Anthony	Dymond, Forrest Edwin
lney Eaton	Ellsworth, Ralph
, Merrill	Epstein, George Joe
arold Louis	Evans, Arthur
yman Lorenzo	Ferrell, Dent
rman Abbott	Fimple, Walter Reynolds
omas James	Finder, Henry James
Edmund Albert	Frederickson, Irving Thomas
erett	Frees, Henry Nelson
gh, Harold Thompson	Frydendall, Archie Danforth
n, Charles Werner	Furman, Edward Louis
n, Edward	Girling, Harry
n, Norman Victor	Gislason, Lawrence
rell Rader	Glass, Kadish
lph Ives	Goldberg, Morton
arren John	Goodman, Ezra Abram
rison	Grossmith, Louis Bertram
an	Gyllenhaal, John Benade
dward Emanuel	Haeger, Milton Otto
ries	Hall, Albert
sell Charles	Hammerschmidt, Alfred
n, Arthur	Harris, Roy Lee
ok, Charles Henry, Jr.	Heinze, Henry Edward
ruce	Held, Lloyd
rnon	Hench, Ralph
ohn Charles	Henderson, Alexander Swift
Cornelius August	Hinchliff, George
David Samuel	Hoban, Edward Francis
dward Hoadley	Hoffman, Harry
remiah Cornelius	Hughes, Joseph
Bart Edward	Hummel, William Fred
Joseph Adams	Hurckes, Bartholomew, Jr.
	Huszagh, Kenneth Arthur
	Idzikoski, Chester

Isbell, Frank Lester
 Johnston, S. William
 Juhnke, Albert Joseph
 Karkow, Walter
 Kiest, Lloyd George
 Klingstedt, John Adolph
 Knaizl, Otto
 Kreuder, Norman William
 Kroeschell, Robert Albert
 Kurz, Arthur Louis
 Lasker, Harry Lewis
 Latimer, John Charles
 Lewis, Alfred Evan
 Lister, Harry
 Longley, Dwight Hixson
 Luchtenmeyer, Lawrence
 Magnus, Joseph
 Magnusson, Daniel
 Mahoney, William Howard
 Mason, Fred
 McKay, Stuart
 McKinstry, Bennett Dandy
 McLean, Charles Douglas
 McNulty, Thomas Joseph
 Meacham, Herbert Franklin
 Meyer, Carl
 Morehouse, Harry Gilbert
 Morris, Thomas
 Mugler, Charles Addison
 Mulholland, Richard Charles
 Mulock, Lester
 Musselwhite, Brooks Jesse
 Nash, Arthur Forrest
 Nelson, Arthur Harry
 Nelson, George Walter
 Newton, Fred
 Norris, Elmer Joseph
 Noto, Louis
 O'Connell, Edward Michael
 Olson, Douglas Leonard
 Ordwiler, Lewis
 Osterman, Axel Hjalmar
 Painter, Walter
 Parker, Walton
 Pascale, Bruno
 Patterson, James Norman
 Payton, Arthur
 Pearse, Thomas
 Plummer, Walter Ludwig
 Post, Charles Ezra
 Prendergast, John Morris
 Rathje, Frank
 Reames, Avra
 Rehak, Charles
 Reiker, George Fred
 Reynolds, Jo
 Richardson, Howard Mills
 Rittenhaus, Roy Lewis
 Robinson, Thomas Joseph

Roe, Roland Harold
 Rucher, Rolle
 Ruddy, James
 Ruehl, Fred
 Sackett, Stanley Charles
 Sand, John Andrew, Jr.
 Scher, David Bernard
 Schneider, Clarence Edgar
 Schueller, Oswald
 Schwinn, Frank
 Shaviro, Nathan
 Shaw, Albert Ellithorp
 Shrader, Harold
 Simpson, Clarence Melville
 Solon, Israel
 Sonnenschein, Leroy
 Southwick, Frank
 Stan, Leo Marian
 Stilling, George
 Stoll, Walter
 Storer, Willis Daniel, Jr.
 Sullivan, Harry John
 Supple, Lee Francis
 Thomas, Morton Stanley
 Trow, Herbert Octavius
 Turner, Stewart Dodge
 Vanderkloot, Adrian Merinus
 Von Zuckow, John Lee
 Voss, Carl Leon
 Waynick, Lynne
 Webber, Carl Brown
 Wettstein, Bryant Emerson
 White, Lloyd
 White, Robert Peltzer
 Wolff, George Frederick
 Wong, Kakin
 Zukerman, William

Girls.

Baty, Jeanette
 Beato, Genevieve
 Beatty, Pearl
 Berg, Vera Marie
 Bodermann, Olga
 Cardona, Winifred
 Chapman, Ivy
 Daly, Alice Rae
 Decker, Edyth
 Denison, Julia Adelaide
 Gungan, Gertrude
 Einfeldt, Clara
 Geringer, Julia Victoria
 Gibbons, Sara
 Gyllenhaal, Agnes Sophia
 Haines, Dorothy Sarah
 Halperin, Minnie
 Haslow, Minnie
 Henius, Gerda Helen

Hershinkel, Annette
Hoffmann, Erna
Howe, Irene Gladys
Huckins, Nellie Cydne
Huth, Emma Frances
Junge, Winifred
Kennedy, Agnes
Kiddar, Adella Louise
Kiest, Florence Emma
King, Leona May
Koester, Sylvia Julia
Kramer, Sarah
Krueger, Martha Augusta
Lange, Camille
Lange, Nellie
Lasley, Evelyn Maud
Lufin, Juliette
Madsen, Alice
Mayer, Helen Frances
Miles, Grace Lillian
Mills, Ivy Irene
Morley, Myrtle
Norris, Katherine
O'Marra, Loretto
Pleas, Lorie
Pleas, Mae
Pollitz, Marie Bernice

Ray, Sadie Seaman
Reed, Ester
Reynolds, Annie
Ring, Blanch
Roberts, Edith
Rossbach, Cora Margarite
Russell, Nellie Marie
Schultz, Mabel
Sexton, Alice
Shaver, Ernestine
Solomon, Grace Geraldine
Somers, Anna May
Spear, Zoia Virginia
Stein, Lucile
Stevens, Helen
Stewart, Cecil Maud
Stoltenberg, Dora
Taylor, Florence Hale
Triner, Libbie Josephine
Tyrrell, Mary Flora
Vognild, Elvira Amanda
Wagner, Leone
Walker, Myra
Ward, Josephine
Welling, Grace
Williams, Laurelet Clement
Worthmann, Estella

Summary of Attendance, 1907-8.

Students in Day Classes	1336
College Students.....	319
Engineering Students (Men).....	128
Science and Arts Students.....	131
Men.....	21
Women.....	110
Unclassified Students.....	60
Men.....	32
Women.....	28
Academy Students.....	827
Classified.....	590
Boys.....	430
Girls.....	160
Unclassified.....	237
Boys.....	164
Girls.....	73
Summer Students (not counted above).....	190
Students in Evening Classes.....	1262
Total.....	<u>2598</u>

OCTOBER 1909

Lewis Institute Bulletin

REGISTER OF 1908-9 AND
ANNOUNCEMENTS FOR 1909-10



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1909 (10)
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in January, 1909, for the 1909-10

PUBLICATIONS OF THE LEWIS INSTITUTE

THE BULLETIN

CONTAINING THE LATEST INFORMATION

RESPECTING THE INSTITUTE AND ITS WORKS, ISSUED IN JANUARY

AND CONTAINING A LIST OF THE NAMES OF THE MEMBERS OF THE INSTITUTE AND THE NAMES OF THE MEMBERS OF THE BOARD OF DIRECTORS.

THE BULLETIN IS PUBLISHED BY THE INSTITUTE, AND IS FREE OF CHARGE TO ALL MEMBERS OF THE INSTITUTE.

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LEWIS INSTITUTE BULLETIN



CHICAGO, OCTOBER, 1909

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CALENDAR

1909														1910													
JANUARY							JULY							JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	1	2	..	..	..	..	1	2	3	..	..	..	..	..	1	2	..	..	..	..	1	2	3
3	4	5	6	7	8	9	4	5	6	7	8	9	10	2	3	4	5	6	7	8	3	4	5	6	7	8	9
10	11	12	13	14	15	16	11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16
17	18	19	20	21	22	23	18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23
24	25	26	27	28	29	30	25	26	27	28	29	30	31	23	24	25	26	27	28	29	24	25	26	27	28	29	30
31	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..	31	..	..	..	..	..	..
FEBRUARY							AUGUST							FEBRUARY							AUGUST						
..	1	2	3	4	5	6	1	2	3	4	5	6	7	..	1	2	3	4	5	6	..	1	2	3	4	5	6
7	8	9	10	11	12	13	8	9	10	11	12	13	14	6	7	8	9	10	11	12	7	8	9	10	11	12	13
14	15	16	17	18	19	20	15	16	17	18	19	20	21	13	14	15	16	17	18	19	14	15	16	17	18	19	20
21	22	23	24	25	26	27	22	23	24	25	26	27	28	20	21	22	23	24	25	26	21	22	23	24	25	26	27
28	..	..	..	..	..	..	29	30	31	..	..	..	..	27	28	..	..	..	..	..	28	29	30	31	..	..	..
MARCH							SEPTEMBER							MARCH							SEPTEMBER						
..	1	2	3	4	5	6	..	..	1	2	3	4	5	..	1	2	3	4	5	6	..	..	1	2	3	4	5
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12	4	5	6	7	8	9	10
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19	11	12	13	14	15	16	17
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26	18	19	20	21	22	23	24
28	29	30	31	..	..	..	26	27	28	29	30	..	..	27	28	29	30	31	..	..	25	26	27	28	29	30	31
APRIL							OCTOBER							APRIL							OCTOBER						
..	..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	1	2	3
4	5	6	7	8	9	10	3	4	5	6	7	8	9	3	4	5	6	7	8	9	2	3	4	5	6	7	8
11	12	13	14	15	16	17	10	11	12	13	14	15	16	10	11	12	13	14	15	16	9	10	11	12	13	14	15
18	19	20	21	22	23	24	17	18	19	20	21	22	23	17	18	19	20	21	22	23	16	17	18	19	20	21	22
25	26	27	28	29	30	..	24	25	26	27	28	29	30	24	25	26	27	28	29	30	23	24	25	26	27	28	29
..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..
MAY							NOVEMBER							MAY							NOVEMBER						
..	..	..	..	..	1	2	..	1	2	3	4	5	6	1	2	3	4	5	6	7	..	1	2	3	4	5	6
3	4	5	6	7	8	9	7	8	9	10	11	12	13	8	9	10	11	12	13	14	6	7	8	9	10	11	12
10	11	12	13	14	15	16	14	15	16	17	18	19	20	15	16	17	18	19	20	21	13	14	15	16	17	18	19
17	18	19	20	21	22	23	21	22	23	24	25	26	27	22	23	24	25	26	27	28	20	21	22	23	24	25	26
24	25	26	27	28	29	30	28	29	30	..	..	..	..	29	30	31	..	..	..	..	27	28	29	30	..	..	..
30	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
JUNE							DECEMBER							JUNE							DECEMBER						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	1	2	3	4	5
6	7	8	9	10	11	12	5	6	7	8	9	10	11	5	6	7	8	9	10	11	4	5	6	7	8	9	10
13	14	15	16	17	18	19	12	13	14	15	16	17	18	12	13	14	15	16	17	18	11	12	13	14	15	16	17
20	21	22	23	24	25	26	19	20	21	22	23	24	25	19	20	21	22	23	24	25	18	19	20	21	22	23	24
27	28	29	30	..	..	..	26	27	28	29	30	31	..	26	27	28	29	30	..	..	25	26	27	28	29	30	31

Institute Calendar—1909-1910

1909— QUARTERLY RECESS FOR ONE WEEK.

Sept. 6-18, Monday to Saturday—Registration of incoming students.

Sept. 20, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.

Sept. 27, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1908-1909.

Oct. 4-8, Monday to Friday, Evenings—Registration and Classification of Candidates for Admission to Evening Classes.

Oct. 11, Monday—Evening Classes begin.

Nov. 25, 26, Thursday and Friday—Thanksgiving Recess.

Dec. 17, Friday—Autumn Quarter ends.

1910— HOLIDAY RECESS FOR TWO WEEKS.

Jan. 3, Monday—Winter Quarter begins.

Feb. 22, Tuesday—Washington's Birthday—A Holiday.

March 25, Friday—Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

April 4, Monday—Spring Quarter begins.

May 19, Thursday—Evening Classes end.

June 18, 25, Saturdays, from 9 A. M. to 1 P. M.—Preliminary Examinations for Admission.

June 24, Friday—Spring Quarter ends.

July 5, Tuesday—Summer Session begins.

Aug. 12, Friday—Summer Session ends.

Sept. 5-17, Monday to Saturday—Registration of incoming students.

Sept. 19, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.

Sept. 26, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1909-1910.

Oct. 3-7, Monday to Friday, Evenings—Registration and Classification of Candidates for Admission to Evening Classes.

Oct. 10, Monday—Evening Classes begin.

Nov. 24-25, Thursday and Friday—Thanksgiving Recess.

Dec. 16, Friday—Autumn Quarter ends.

CORPORATION

OFFICERS.

CHRISTIAN CECIL KOHLSAAT,
President.

THOMAS KANE,
Vice-President.

JOHN McLAREN,
Secretary and Treasurer.

TRUSTEES.

BERNARD ALBERT ECKHART,
OLIVER HARVEY HORTON,

THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN.

BOARD OF MANAGERS.

BION JOSEPH ARNOLD,
GEORGE NOBLE CARMAN,
BERNARD ALBERT ECKHART,
JAMES BRYAN HERRICK,
OLIVER HARVEY HORTON,

EDMUND JAMES JAMES,
HARRY PRATT JUDSON,
THOMAS KANE,
CHRISTIAN CECIL KOHLSAAT,
JOHN McLAREN,

ADDISON ELDRED WELLS.

GEORGE NOBLE CARMAN, *Director.*

WILLIAM HERBERT HALL, *Business Manager.*

Officers of Administration and Instruction

ADMINISTRATIVE OFFICERS.

- GEORGE NOBLE CARMAN, A. M.**
Director.
- EDWIN HERBERT LEWIS, Ph. D., Litt. D.**
Dean of College Students.
- *CHARLES WESLEY MANN, A. M.**
Dean of Academy Students.
- ALEXANDER WILLETT MOSELEY, S. B.**
Head of Department of Engineering.
- HELEN DOUGAL STREET, A. M.**
Dean of Women Students.
- PHILEMON BULKLEY KOHLSAAT, Ph. B.**
Registrar.

OFFICERS OF INSTRUCTION.

(The names in each group appear in the order of appointment to the group.)

- GEORGE NOBLE CARMAN, A. M.**
Professor of Economics.
- EDWIN HERBERT LEWIS, Ph. D., Litt. D.**
Professor of English.
- *CHARLES WESLEY MANN, A. M.**
Professor of History.
- PHILIP BELL WOODWORTH, B. S., M. E.**
Professor of Physics.
- CLARENCE ELBERT DEPUY, B. S.**
Professor of Machine Construction.
- ALEXANDER WILLETT MOSELEY, S. B.**
Professor of Mechanics.
- WARREN RUFUS SMITH, Ph. D.**
Professor of Chemistry.
- HERBERT EDGAR COBB, A. M.**
Professor of Mathematics.
- FRED A. ROGERS, B. S.**
Professor of Physics and Electrical Engineering.
- JESSIE LOUISE JONES, Ph. D.**
Professor of German.
- GEORGE LEE TENNEY, A. M.**
Professor of Latin.

*Died May 1, 1909.

CHARLES EMERSON PEET, B. S.

Professor of Physiography.

JOHN DEEK NIES, B. S.

Professor of Electrical Engineering.

DUANE STUDLEY, B. S.

Assistant Professor of Mathematics.

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Assistant Professor of English.

BERKELEY JOHN THOMAS, A. M.

Assistant Professor of Mathematics.

HELEN DOUGAL STREET, A. M.

Assistant Professor of Ancient History.

DIO HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry.

JESSE MYRON OWEN, Ph. B.

Assistant Professor of English.

MILO MILTON QUAIFF, Ph. D.

Assistant Professor of History.

LEA RACHEL DELAGNEAU

Instructor in French.

LOUIS EDWARD POPE

Instructor in Mathematics.

MARIE ELSA BLANKE

Instructor in Freehand Drawing.

GEORGE ALEXANDER ROSS

Instructor in Woodwork.

CHARLES EDGAR HOYT

Instructor in Foundry Work.

JULIA DUMKE PEET, Ph. B.

Instructor in German.

EDWARD HERMAN LAY, A. B.

Instructor in Mathematics.

WILLIAM PARKER HAWLEY, B. S.

Instructor in Mechanical Drawing.

KATE BELLE MILLER, Ph. B.

Instructor in English.

ETHEL PERCY ANDRUS, Ph. B.

Instructor in English.

*JOSEPH EDWARD HORA, B. S.

Instructor in Chemistry.

KATHERINE ISABEL INGERSOLL

Instructor in charge of Sewing and Millinery.

*Died March 25, 1909.

OFFICERS OF INSTRUCTION.

9

- HORACE BERNARD McCABE**
Instructor in Machine Shop Work.
- EDWARD LESTER WHEELER**
Instructor in Physical Culture.
- MINNA CAROLINE DENTON, A. M.**
Instructor in Physiology and Bacteriology.
- MABEL THACHER WELLMAN, A. B.**
Instructor in Charge of Domestic Science.
- ALPHONSO WIRTH CAVANAUGH**
Instructor in Mathematics.
- ANNA ELIZABETH DRUMMOND, A. B.**
Instructor in English.
- HELMUT BERENS, A. B.**
Instructor in German.
- FREDERICK LESTER HAVENS**
Instructor in Forge and Machine Shop Work.
- *ALMA MARY HOLDEN, Ph. B.**
Instructor in Latin.
- JUSTIN WYMAN LUDLOW, M. E., O. E.**
Instructor in Mechanics.
- FRED LEWIS TURNER, A. M.**
Instructor in Latin.
- ZOURA LANE CLARK, A. B.**
Instructor in English.
- EDNA NEWTON MCCALLUM, A. B.**
Instructor in Latin.
- GEORGE FREDERICK CASSELL, A. B.**
Instructor in German.
- GRACE EMERSON MOORE**
Instructor in Cooking.
- VICTOR LOUIS SHEERMAN**
Instructor in Mechanical Drawing.
- JULIA GRACE MERRILL**
Instructor in Cooking.
- JUDSON FISKE LEE, A. M.**
Instructor in History and Economics.
- FRANCES TALCOTT**
Librarian.
- ZELLA SLATER BISSELL, A. B.**
Stenographer.
- LOIS MARTIN**
Instructor in Sewing.

**Resigned.*

GRACE LUCILE HENNECKE
Instructor in Millinery.

JOHN PAUL BAIRD
Instructor in Woodwork.

ROBERT FREDERICK BIESEMEIER
Instructor in Machine Shop Work.

ANNA EARL GRADY
Instructor in Textiles.

JUDSON THOMAS WEBB
Instructor in Pottery.

RHODA EBYE
Assistant in Physical Culture.

EDWIN D. LEMAN
Assistant in Chemistry.

ADOLPH C. H. FENSHOLT
Assistant in Physics.

FRANK HARRISON WADE
Assistant in Physics.

GERTRUDE AYER HUBBARD
Assistant in Sewing.

LAURA M. WINKLEMAN
Assistant in Millinery.

RHODA ELLEN DICK
Assistant in Domestic Economy.

JANE HEAP
Assistant in Decorative Metal Work.

CHARLES B. KAZDA
Assistant in Mathematics.

GRACE GORDON HOOD
Assistant in Cooking.

*CAROLINE WILKIE KOHLSAAT
Conductor of Chorus.

KATHARINE HOWARD
Assistant in Music.

PORTIA CAERNES
Assistant in Dramatics.

ELIZABETH AGNES CADIGAN
Clerk and Telephone Attendant.

*Resigned.

General Information

Scope of Work

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in four main divisions, viz.: Mechanical Engineering; Mechanic Arts; Domestic Economy; the Liberal Arts. The Institute grants the degree of Bachelor of Science in Mechanical Engineering, the title of Associate, and the Academy Certificate. The degree represents four years of college work, the title two years of college work, and the certificate four years of academy work.

Requirements for Admission

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

Applicants for admission other than those mentioned above will be examined on such subjects as are prerequisites for the studies which they wish to pursue.* In all cases the test will call for intelligence rather than for technical knowledge.

Assignment of Studies

On entering the Institute a student is assigned to such studies as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Courses of Instruction" and "Units"

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

A unit consists regularly of three academy courses (a year's work) in any given subject.

Bachelor of Science in Mechanical Engineering

To be enrolled as a candidate for the degree of Bachelor of Science in Mechanical Engineering, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 19-36:

Courses	Units.
English, 1-9	3
Mathematics, 1-6, 10-12	3
German, A-F	2
Science, or additional foreign language.....	2
History, 4-6	1
Physics, 1-3	1
Drawing, Mechanic Arts, 1, 5, 6.....	1
Shopwork, Mechanic Arts, 2, 3, 4, 7, 19, 20.....	2

*For example, applicants for entrance into the first year of academy work will be examined on English, arithmetic, history of the United States, and geography, as taught in the Chicago grammar schools.

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Bachelor of Science in Mechanical Engineering. The requirements are shown in detail in the curriculum (see next page).

The Title of Associate in Arts

To be enrolled as a candidate for the title of Associate the student must offer fifteen units of high school work, three of which shall be in English and two in Mathematics. A unit is a course of study covering a school year of at least 36 weeks, with 4 or 5 recitation periods a week, amounting to not less than 120 hours.

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

The Title of Associate in Domestic Economy

To obtain the Title of Associate in Domestic Economy the student must secure, in addition to fifteen admission units, credit for the prescribed work in Chemistry, Physiology, Bacteriology and Domestic Economy (seventeen courses), and one course in English Composition.

The Academy Certificate

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and *opportunities*.

**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM LEADING TO
DEGREE OF B. S. IN MECHANICAL ENGINEERING.***

FIRST YEAR.											
AUTUMN QUARTER			WINTER QUARTER			SPRING QUARTER					
	Course.	Hours.		Course.	Hours.		Course.	Hours.		Course.	Hours.
English.....	1	55	English.....	2	55	English.....	3	55			
Algebra.....A W	1	55	Algebra.....W S	2	55	Algebra.....A S	3	55			
Machine Sketching E	1	10	Wood Shop.....E	2	10	Instrum'l Drawing.	3	50			
Physiography.....	1	10	Physiography.....	2	10	Physiography.....	3	10			
SECOND YEAR.											
English.....	4	5	English.....	5	5	English.....	6	5			
Plane Geometry A W	4	5	Plane Geometry..WS	5	5	Plane Geometry..A S	6	5			
Projection Draw'g E	6	10	Forge Shop.....E	3	10	Foundry.....E	4	10			
German.....A	5		German.....B	5		German.....C	5				
THIRD YEAR.											
American History...	4	5	American History...	5	5	American History...	6	5			
Physics.....	1	10	Physics.....	2	10	Physics.....	3	10			
Machine Shop.....E	19	10	Machine Shop.....E	20	10	Pattern Shop.....E	7	10			
German.....D	5		German.....E	5		German.....F	5				
FOURTH YEAR.											
English.....A W	7	5	English.....W S	8	5	English.....	9	5			
Algebra.....A W	10	5	Algebra.....W S	11	5	Solid Geometry.....	12	5			
Pattern Shop.....	8	10	Machine Shop.....E	22	10	Machine Shop.....E	23	10			
German.....G	5		German.....H	5		German.....I	5				

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF B. S. IN MECHANICAL ENGINEERING.**

FIRST YEAR											
English.....	A	5	English.....	B	5	English.....	C	5			
Algebra.....A W	13	5	Trigonometry...W E	14	5	Analyt'l Geometry...	15	5			
Chemistry.....	1	14	Chemistry.....	2	14	Chemistry.....	3	14			
Machine Draw'g...E	10	10	Machine Sketching..	11	10	Surveying.....	13	10			
SECOND YEAR.											
Economics.....	10	5	Economics.....	11	5	Industrial History...	12	5			
Calculus.....	16	5	Calculus.....	17	5	Calculus.....	18	5			
Physics.....	4	15	Physics.....	5	15	Physics.....	6	15			
Kinematics.....	28	7	Deser'ptive Geomet'y	25	7	Machines.....	15	17			
THIRD YEAR.											
Mechanics.....	16	5	Mechanics.....	17	5	Mechanics.....	18	5			
Thermodynamics...	43	7	Machine Shop.....	23	10	Valve Gears.....	31	10			
Electrical Laborat'y	35	10	Electrical Laborat'y	36	10	Electrical Laborat'y	37	10			
Machine Draw'g..A S	12	10	Foundry.....	9	10	Mach. Tool Anal....	24	10			
FOURTH YEAR.											
Hydraulics.....	42	10	Direct Current Mach.	38	5	Induction, Motors, etc	39	5			
Machine Design.....	32	10	Chemistry.....	12	15	Power Plants.....	49	10			
Materials of Const..	46	10	Struct'l Steel Work..	33	10	Machine Design.....	13	5			
Thesis.....	2		Thesis.....	2		Chemistry.....	24	10			
						Specifications.....	50	2			

*When a Course is given in more than one quarter, the quarter in indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring.

SUGGESTED ACADEMY AND COLLEGE CURRICULUM LEADING TO TITLE OF ASSOCIATE IN ARTS.

FIRST YEAR.											
AUTUMN QUARTER			WINTER QUARTER			SPRING QUARTER					
	Course	Hours		Course	Hours		Course	Hours		Course	Hours
English.....	1	5	English.....	2	5	English.....	3	5			
Algebra..... A W	1	5	Algebra..... W S	2	5	Algebra..... A S	3	5			
Latin.....	1	5	Latin.....	2	5	Latin.....	3	5			
Physiography.....	1	10	Physiography.....	2	10	Physiography.....	3	10			
SECOND YEAR.											
English.....	4	5	English.....	5	5	English.....	6	5			
Plane Geometry. A W	4	5	Plane Geometry. W S	5	5	Plane Geometry. A S	6	5			
Latin.....	4	5	Latin.....	5	5	Latin.....	6	5			
Ancient History.....	1	5	Ancient History.....	2	5	Ancient History.....	3	5			
THIRD YEAR.											
American History....	4	5	American History....	5	5	American History....	6	5			
Physics.....	1	10	Physics.....	2	10	Physics.....	3	10			
Latin.....	7	5	Latin.....	8	5	Latin.....	9	5			
German..... A S			German..... B S			German..... C S					
FOURTH YEAR.											
English.....	7	5	English.....	8	5	English.....	9	5			
Algebra..... A W	10	5	Algebra..... W S	11	5	Solid Geometry.....	12	5			
Latin.....	10	5	Latin.....	11	5	Latin.....	12	5			
German..... D S			German.....			German..... F S					
FIFTH YEAR.											
English.....	10	5	English.....	11	5	English.....	12	5			
European History....	7	5	European History....	8	5	European History....	9	5			
Latin or.....	13	5	Latin or.....	14	5	Latin or.....	15	5			
German or.....	4	5	German or.....	5	5	German or.....	6	5			
French.....	1	5	French.....	2	5	French.....	3	5			
SIXTH YEAR.											
English.....	13	5	English.....	14	5	Philosophy.....	1	5			
Latin or.....	16	5	Latin or.....	17	5	Latin or.....	18	5			
Economics or.....	10	5	Economics or.....	11	5	Industrial History or.	12	5			
German or.....	7	5	German or.....	8	5	German or.....	9	5			
French.....	4	5	French.....	4	5	French.....	5	5			

TWO-YEAR COLLEGE CURRICULUM LEADING TO TITLE OF ASSOCIATE IN DOMESTIC ECONOMY.

FIRST YEAR											
Chemistry.....	A	10	Chemistry.....	B	10	Chemistry.....	C	10			
Cooking..... A W	4	10	Cooking..... W S	5	10	Plant Physiology....	E	3	10		
Sewing and Design...	D	10	Sewing and Design...	E	10	Sewing and Drafting.	F	10			
English.....		10									
SECOND YEAR.											
Physiology..... A W	4	10	Bacteriology A W	5	10	Sanitation.....		10	5		
Food and Dietetics...	7	10	Food and Dietetics..	8	10	Economics of Home..		9	10		
Millinery and Sewing	G	10	Sewing and Textiles.	H	10	Millinery & Laundry.		1	10		
						Cooking.....		6	10		

The Co-operative Course in Mechanic Arts

A two-year course in Mechanic Arts is given in co-operation with a number of Chicago metal trade manufacturers. The age limit of the boys is from 16 to 20 years. They are divided into two sections, one of which is in school while the other is in the shop, alternating from week to week. The employer pays the tuition fee of \$50 a year for each boy and pays him \$5 a week for every week he works in the shop. The boys are in the shop 26 weeks and in school 24 weeks each year.

Half-Day, Evening, and Summer Courses

As a rule students in the day classes are expected to make their work systematic by aiming definitely toward the degree, the title or the certificate. It is recognized, however, that many students are obliged to leave school in order to take care of themselves and those dependent upon them, at a time when their more fortunate associates enter upon such courses of instruction as are herein outlined. To such students the Institute offers opportunities for special instruction in accordance with their needs, particularly in the line of shopwork, mechanical drawing and domestic economy. Such as can attend the Institute but half of each day may, by prolonging the time requirement, complete the work of some one group of studies, or at least make advancement in one or more subjects.

Provision has also been made for such evening instruction as will enable young men and women who are employed during the day to continue their education along those lines which will be of the most service to them in the work in which they are engaged. In point of number of students and benefits derived by them no work of the Institute is more important.

The summer courses are designed for students who wish to shorten the time necessary for completing the work required for graduation, to make up deficiencies in scholarship, or to pursue special courses in the shops or laboratories. Any course of instruction offered by the Institute will be repeated during the summer, if the demand is such as to justify the formation of a *class*.

Tuition and Fees

Day students are required to pay a registration fee of five dollars. This fee is due at the time of registration. The rate of tuition for day students is twenty dollars a quarter. Where a student limits himself to one course of instruction, with five hours of class work each week, there is a reduction of ten dollars a quarter. In laboratory, drawing and shopwork, ten hours, or a fraction thereof, count as five in determining the charge.

The rate for evening students is five dollars for a term of ten weeks for one course of instruction, two evenings a week, and ten dollars for two courses, four evenings a week.

The tuition for the summer term for each course of five hours a week of class instruction is five dollars. Students who attend only in the summer are not required to pay the registration fee.

Both day and evening students who take one or more shop or laboratory courses in the departments of physics, chemistry, mechanic arts, engineering and cookery are required to pay a shop or laboratory fee of five dollars a quarter or term.

Students in chemistry deposit five dollars to cover breakage. If the charges do not amount to five dollars, the excess is returned to the student.

All payments are due in advance, on the first day of the quarter. Checks and money orders should be made payable to Lewis Institute.

Scholarships

Three scholarships, each amounting to one year's tuition, have been established under the will of the late Mrs. Hugh A. White. Mr. John McLaren was named in the will to assign these scholarships.

Three additional scholarships, amounting respectively to one, two and three quarters' tuition, are assigned by the Institute for excellence in public speaking. These scholarships are assigned in the fourth year of the academy work and are available in the first year of college.

Standings and Reports

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction

NOTE.—The Courses of Instruction offered are tabulated on pages 14 and 15 and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20, 22; Mathematics, 1-12; Physics, 1-3; Physiography, 1-3; Domestic Economy, A-C, 1-3; History, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-11, 21, 23; Engineering, 12-50; Mathematics, 13-18; Physics, 4-6; Chemistry, A-24; Geology, 4; Physiology and Bacteriology, 1, 2, 3; Philosophy, 1; Domestic Economy, D-I, 4-10; History and Economics, 7-12; English, 10-14, A-C; German, 1-9; French, 1-9; Latin, 13, 18.

Mechanic Arts

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who are preparing for the profession of mechanical engineer. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. **MACHINE SKETCHING.** Constructive work in perspective. Dimensioned sketches of machine parts.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. **WOOD WORK.** A Continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes, and finishes. Practice with woodworking machinery.

3. **FORGE WORK.** Simple forging. Hardening and tempering. Work with steam hammer.

4. **FOUNDRY WORK.** Study of modern foundry construction, equipment, materials and methods. Practice in molding, coremaking, melting, and pouring.

5. **INSTRUMENTAL DRAWING.** The first work with drawing instruments. Lettering and conventional representation of threads, bolts and nuts, and fastenings. Construction of mathematical curves. Designed to establish standard methods.

6. **PROJECTION DRAWING.** Planes of projection; intersections, including conic sections; revolution of views and development of surfaces.

7. **PATTERN MAKING.** Practice in making simple patterns. Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

8. **PATTERN MAKING.** A continuation of Course 7.

9. **ADVANCED FOUNDRY WORK.** Problems introduced by heavy castings, production, and molding machines; foundry equipment and arrangement; correlation of work of foundry with that of pattern shop, machine shop, and drafting room.

10. **MACHINE DRAWING.** Making of detail drawings and assembly drawings of machines; tracing.

10a. **MACHINE DRAWING.** A continuation of Course 10. Mechanical drawing and tracing.

11. **ADVANCED MACHINE SKETCHING.** Making of perspective sketches from mechanical drawings and empirical formulas. Intended to develop the student's sense of proportion and to acquaint him with the mechanism and details of certain machines.

19. **BENCH METAL WORK.** Description of the materials commonly used in machine work and the tools employed in bench and floor work; practice in chipping, filing, laying-out, and other processes.

20. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

21. **FORGE WORK.** Jig, steam hammer, and special work. Shop methods, cost estimating, forge shop equipment.

22. **MACHINE TOOL WORK.** (One or more quarters.) Practice with machine tools, hand tools, standard gauges, and measuring instruments in making, finishing, and assembling machines and machine parts, taps, dies, reamers, milling cutters, punching and drawing dies.

23. **GEAR AND CAM CONSTRUCTION.** Practice with machine tools and instruments in the application of the principles of mechanism to the construction of spur, bevel, and spiral gears, racks, and cams. Prerequisite: *Engineering 12 and 28.*

Engineering

The courses grouped in this division are open to college students and include applied mathematics, applied electricity, testing of machinery and materials, machine design, and thesis. These courses, in conjunction with the college mathematics, chemistry, physics, mechanic arts, English, history, and economics, lead up to the degree of Bachelor

of Science in Mechanical Engineering. The studies are so arranged, however, that those students in engineering who do not expect to receive the degree may derive much benefit by closely following the regular arrangement of studies during the time that they are able to remain at the Institute.

12. **ADVANCED MACHINE DRAWING.** Gearing and cams. Problems to develop the adaptive and inventive faculties of the student. Consideration of shop processes and limitations of tools. Tracing. Prerequisite: *Engineering 28*.

13. **SURVEYING.** Measurement of distances by pacing, chain, and tape. Practice in the use of compass, transit, and level in land and city surveying, leveling, and the running of simple railway curves. Study of the construction, testing, and adjustment of instruments. Field records and office copies. Prerequisite: *Mechanic Arts 1 and 6; Mathematics 14*.

15. **MACHINES.** Elements of the steam engine, steam boiler, pump, and other machines. The steam engine is studied more especially as a heat engine and as a kinematic machine in preparation for the regular courses in thermodynamics and valve gears. Measurement of power. Prerequisite: *Course 28*.

16. **MECHANICS, STATICS.** Composition and equilibrium of concurrent and non-concurrent forces; suspended weight and catenary. Prerequisite: *Physics 4; Mathematics 15 and 18*.

17. **MECHANICS, KINETICS.** Rectilinear motion; virtual velocities; moment of inertia; dynamics of a rigid body; work, energy, and power; friction. Prerequisite: *Course 16*.

18. **MECHANICS, STRENGTH OF MATERIALS.** Elementary stresses and strains; flexure of beams; continuous girders; flexure of long columns; combined stresses. Prerequisite: *Course 17*.

24. **MACHINE TOOL ANALYSIS.** The study of existing machines and tools to determine the principles involved in their construction; examining and testing of machines and mechanisms for rigidity, accuracy, or efficiency. Prerequisite: *Course 12; Mechanic Arts 23*.

25. **DESCRIPTIVE GEOMETRY.** Graphical methods for the solution of problems in the intersections of lines and surfaces. Prerequisite: *Mechanic Arts 11; Mathematics 15*.

27. **MACHINE DESIGN.** Stresses in machine parts, especially under the conditions of motion. Prerequisite: *Course 32*.

28. **KINEMATICS.** A study of the laws of the communication of motion by mechanisms. Rolling and sliding contact, linkwork, belts and bands, aggregate combinations. Prerequisite: *Mechanic Arts 11; Mathematics 15*.

31. **VALVE GEARS.** The application of the principles of the courses in Machines (15), Kinematics (28), and Thermodynamics (43), to the study of various types of valves and valve gears. Prerequisite: *Courses 28 and 43*.

2. **INTERNAL FORCE**. The elements of stress-strain theory. Study of the different types of stress. Elastic stress. Prerequisite: Course 13 and 14.

3. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

4. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

5. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

6. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

7. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

8. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

9. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

10. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

11. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

12. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

13. **INTERNAL FORCE**. The study of the stress and strain of the last course for the first and second unconnected bridge. Prerequisite: Prerequisite: Course 4.

14. **THE THESIS**. During the senior year the student completes a thesis on some engineering subject. He is assigned to that instructor under whose supervision his subject of thesis properly lies. The three weeks now is set apart for thesis work and the conferences between student and instructor are held at that time. The thesis is under the general supervision of an instructor in English whom the student will meet at stated times to consult upon the manner of presentation. The copy must be typewritten and of standard dimensions and binding, junction with deposited in the library before graduation. The Institute arts, English, in right of publication.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. *It is hoped that the student who has taken*

32. **MACHINE DESIGN.** The elements of steam-engine design. Study of the different types of boilers. Boiler design. Prerequisite: *Courses 18 and 31.*

33. **STRUCTURAL STEEL WORK.** The study of the stresses and details of the plate girder, roof truss, and simple pin-connected bridge. Current specifications. Prerequisite: *Course 46.*

35. **DIRECT CURRENT PRINCIPLES AND PRACTICE.** Magnetic and electric calculations for generators and motors; armature windings; characteristic curves; wiring; instruments. Prerequisite: *Physics 6; Mathematics 18.*

36. **ALTERNATING CURRENT PRINCIPLES.** Sine functions; vectors; reactance; condensance; impedance; series parallel circuits; transmission lines. Prerequisite: *Course 35.*

37. **ALTERNATING CURRENT MACHINERY.** Transformer; generator; induction motor; synchronous motor; rotary converter. Prerequisite: *Course 36.*

38. **DIRECT CURRENT MACHINERY.** Motor control systems. Armature reaction. Distortion of field flux. Harmonic analysis. Rotary converter wave form. Prerequisite: *Course 37.*

39. **INDUCTION MOTOR, FLUX DISTRIBUTION, etc. SYNCHRONOUS APPARATUS.** Prerequisite: *Course 38.*

42. **HYDRAULICS.** The mechanics of fluids at rest and in motion; flow of water through weirs, orifices, and pipes; pumps and motors; study of design of turbine. Class room and laboratory. Prerequisite: *Course 17.*

43. **THERMODYNAMICS.** The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Course 15; Mathematics 18.*

46. **MATERIALS OF CONSTRUCTION.** The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Course 18.*

49. **POWER PLANTS.** Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses 43 and 44.*

50. **SPECIFICATIONS AND CONTRACTS.** A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

51. **THE THESIS.** During the senior year the student completes a thesis on some engineering subject. He is assigned to that instructor under whose supervision his subject of thesis properly lies. The three o'clock hour is set apart for thesis work, and the conferences between student and instructor are held at that time. The thesis is under the general supervision of an instructor in English, whom the student will meet at stated times to consult upon the manner of presentation. The thesis shall be typewritten and of standard dimensions and binding. It shall be deposited in the library before graduation. The Institute reserves the right of publication.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken

this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA.** Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. **ADVANCED ALGEBRA.** Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. **SOLID GEOMETRY.** Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. **ALGEBRA.** Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS.** Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS.** Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS.** Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize stu-

dents with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. **GENERAL PHYSICS.** Mechanics: A discussion and illustration of physical quantities and their measurement; simple types of motion; density; velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. **LABORATORY PHYSICS.** Strictly quantitative, covering subjects named above.

2. **GENERAL PHYSICS.** Heat: Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. Sound: Waves, sounds and their relations, sonorous bodies, compound tones and musical instruments. Light: Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves; color; polarization. **LABORATORY PHYSICS.** Quantitative work in heat, sound, and light.

3. **GENERAL PHYSICS.** Electricity: Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. **LABORATORY PHYSICS.** Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators, and calibration of instruments.

4. **MECHANICS.** Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics 14.*

5. **ELECTRICAL MEASUREMENTS.** Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients, calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics 14.*

6. **HEAT AND LIGHT.** Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics 14.*

Standings and Reports

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction

NOTE.—The Courses of Instruction offered are tabulated on pages 14 and 15 and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20, 22; Mathematics, 1-12; Physics, 1-3; Physiography, 1-3; Domestic Economy, A-C, 1-3; History, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-11, 21, 23; Engineering, 12-50; Mathematics, 13-18; Physics, 4-6; Chemistry, A-24; Geology, 4; Physiology and Bacteriology, 1, 2, 3; Philosophy, 1; Domestic Economy, D-I, 4-10; History and Economics, 7-12; English, 10-14, A-C; German, 1-9; French, 1-9; Latin, 13.18.

Mechanic Arts

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who are preparing for the profession of mechanical engineer. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. **MACHINE SKETCHING.** Constructive work in perspective. Dimensioned sketches of machine parts.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. **WOOD WORK.** A Continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes, and finishes. Practice with woodworking machinery.

3. **FORGE WORK.** Simple forging. Hardening and tempering. Work with steam hammer.

4. **FOUNDRY WORK.** Study of modern foundry construction, equipment, materials and methods. Practice in molding, coremaking, melting, and pouring.

5. **INSTRUMENTAL DRAWING.** The first work with drawing instruments. Lettering and conventional representation of threads, bolts and nuts, and fastenings. Construction of mathematical curves. Designed to establish standard methods.

6. **PROJECTION DRAWING.** Planes of projection; intersections, including conic sections; revolution of views and development of surfaces.

7. **PATTERN MAKING.** Practice in making simple patterns. Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

8. **PATTERN MAKING.** A continuation of Course 7.

9. **ADVANCED FOUNDRY WORK.** Problems introduced by heavy castings, production, and molding machines; foundry equipment and arrangement; correlation of work of foundry with that of pattern shop, machine shop, and drafting room.

10. **MACHINE DRAWING.** Making of detail drawings and assembly drawings of machines; tracing.

10a. **MACHINE DRAWING.** A continuation of Course 10. Mechanical drawing and tracing.

11. **ADVANCED MACHINE SKETCHING.** Making of perspective sketches from mechanical drawings and empirical formulas. Intended to develop the student's sense of proportion and to acquaint him with the mechanism and details of certain machines.

19. **BENCH METAL WORK.** Description of the materials commonly used in machine work and the tools employed in bench and floor work; practice in chipping, filing, laying-out, and other processes.

20. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

21. **FORGE WORK.** Jig, steam hammer, and special work. Shop methods, cost estimating, forge shop equipment.

22. **MACHINE TOOL WORK.** (One or more quarters.) Practice with machine tools, hand tools, standard gauges, and measuring instruments in making, finishing, and assembling machines and machine parts, taps, dies, reamers, milling cutters, punching and drawing dies.

23. **GEAR AND CAM CONSTRUCTION.** Practice with machine tools and instruments in the application of the principles of mechanism to the construction of spur, bevel, and spiral gears, racks, and cams. Prerequisite: *Engineering 12 and 28.*

Engineering

The courses grouped in this division are open to college students and include applied mathematics, applied electricity, testing of machinery and materials, machine design, and thesis. These courses, in conjunction with the college mathematics, chemistry, physics, mechanic arts, English, history, and economics, lead up to the degree of Bachelor

of Science in Mechanical Engineering. The studies are so arranged, however, that those students in engineering who do not expect to receive the degree may derive much benefit by closely following the regular arrangement of studies during the time that they are able to remain at the Institute.

12. **ADVANCED MACHINE DRAWING.** Gearing and cams. Problems to develop the adaptive and inventive faculties of the student. Consideration of shop processes and limitations of tools. Tracing. Prerequisite: *Engineering 28*.

13. **SURVEYING.** Measurement of distances by pacing, chain, and tape. Practice in the use of compass, transit, and level in land and city surveying, leveling, and the running of simple railway curves. Study of the construction, testing, and adjustment of instruments. Field records and office copies. Prerequisite: *Mechanic Arts 1 and 6; Mathematics 14*.

15. **MACHINES.** Elements of the steam engine, steam boiler, pump, and other machines. The steam engine is studied more especially as a heat engine and as a kinematic machine in preparation for the regular courses in thermodynamics and valve gears. Measurement of power. Prerequisite: *Course 28*.

16. **MECHANICS, STATICS.** Composition and equilibrium of concurrent and non-concurrent forces; suspended weight and catenary. Prerequisite: *Physics 4; Mathematics 15 and 18*.

17. **MECHANICS, KINETICS.** Rectilinear motion; virtual velocities; moment of inertia; dynamics of a rigid body; work, energy, and power; friction. Prerequisite: *Course 16*.

18. **MECHANICS, STRENGTH OF MATERIALS.** Elementary stresses and strains; flexure of beams; continuous girders; flexure of long columns; combined stresses. Prerequisite: *Course 17*.

24. **MACHINE TOOL ANALYSIS.** The study of existing machines and tools to determine the principles involved in their construction; examining and testing of machines and mechanisms for rigidity, accuracy, or efficiency. Prerequisite: *Course 12; Mechanic Arts 23*.

25. **DESCRIPTIVE GEOMETRY.** Graphical methods for the solution of problems in the intersections of lines and surfaces. Prerequisite: *Mechanic Arts 11; Mathematics 15*.

27. **MACHINE DESIGN.** Stresses in machine parts, especially under the conditions of motion. Prerequisite: *Course 32*.

28. **KINEMATICS.** A study of the laws of the communication of motion by mechanisms. Rolling and sliding contact, linkwork, belts and bands, aggregate combinations. Prerequisite: *Mechanic Arts 11; Mathematics 15*.

31. **VALVE GEARS.** The application of the principles of the courses in Machines (15), Kinematics (28), and Thermodynamics (43), to the study of various types of valves and valve gears. Prerequisite: *Courses 28 and 43*.

32. **MACHINE DESIGN.** The elements of steam-engine design. Study of the different types of boilers. Boiler design. Prerequisite: *Courses 18 and 31.*

33. **STRUCTURAL STEEL WORK.** The study of the stresses and details of the plate girder, roof truss, and simple pin-connected bridge. Current specifications. Prerequisite: *Course 46.*

35. **DIRECT CURRENT PRINCIPLES AND PRACTICE.** Magnetic and electric calculations for generators and motors; armature windings; characteristic curves; wiring; instruments. Prerequisite: *Physics 8; Mathematics 18.*

36. **ALTERNATING CURRENT PRINCIPLES.** Sine functions; vectors; reactance; condensance; impedance; series parallel circuits; transmission lines. Prerequisite: *Course 35.*

37. **ALTERNATING CURRENT MACHINERY.** Transformer; generator; induction motor; synchronous motor; rotary converter. Prerequisite: *Course 36.*

38. **DIRECT CURRENT MACHINERY.** Motor control systems. Armature reaction. Distortion of field flux. Harmonic analysis. Rotary converter wave form. Prerequisite: *Course 37.*

39. **INDUCTION MOTOR, FLUX DISTRIBUTION, etc. SYNCHRONOUS APPARATUS.** Prerequisite: *Course 38.*

42. **HYDRAULICS.** The mechanics of fluids at rest and in motion; flow of water through weirs, orifices, and pipes; pumps and motors; study of design of turbine. Class room and laboratory. Prerequisite: *Course 17.*

43. **THERMODYNAMICS.** The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Course 15; Mathematics 18.*

46. **MATERIALS OF CONSTRUCTION.** The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Course 18.*

49. **POWER PLANTS.** Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses 43 and 44.*

50. **SPECIFICATIONS AND CONTRACTS.** A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

51. **THE THESIS.** During the senior year the student completes a thesis on some engineering subject. He is assigned to that instructor under whose supervision his subject of thesis properly lies. The three o'clock hour is set apart for thesis work, and the conferences between student and instructor are held at that time. The thesis is under the general supervision of an instructor in English, whom the student will meet at stated times to consult upon the manner of presentation. The thesis shall be typewritten and of standard dimensions and binding. It shall be deposited in the library before graduation. The Institute reserves the right of publication.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. *It is hoped that the student who has taken*

this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA.** Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. **ADVANCED ALGEBRA.** Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. **SOLID GEOMETRY.** Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. **ALGEBRA.** Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS.** Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS.** Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS.** Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize stu-

dents with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. **GENERAL PHYSICS.** Mechanics: A discussion and illustration of physical quantities and their measurement; simple types of motion; density; velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. **LABORATORY PHYSICS.** Strictly quantitative, covering subjects named above.

2. **GENERAL PHYSICS.** Heat: Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. Sound: Waves, sounds and their relations, sonorous bodies, compound tones and musical instruments. Light: Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves; color; polarization. **LABORATORY PHYSICS.** Quantitative work in heat, sound, and light.

3. **GENERAL PHYSICS.** Electricity: Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. **LABORATORY PHYSICS.** Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators, and calibration of instruments.

4. **MECHANICS.** Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics 14.*

5. **ELECTRICAL MEASUREMENTS.** Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients, calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics 14.*

6. **HEAT AND LIGHT.** Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics 14.*

signed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, *First Manual of Composition*, revised edition; Lewis, *Introduction to the Study of Literature*; Moulton, *Old Testament Stories*; Shakspeare, *The Merchant of Venice*, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the *Riverside Literature Series*, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's *Life of Lincoln*. These books are referred to below by abbreviations.

1. Average sections cover *First Manual*, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover *First Manual*, II., and *Introduction*, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover *First Manual*, III., and *Introduction*, VI.-X. Special sections abbreviate *Introduction*.

4. Average sections cover *First Manual*, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover *First Manual*, V., Schurz's *Lincoln* (133), and Warner (37). Special sections omit 37.

6. Average sections cover *First Manual*, VI., and *The Merchant of Venice*.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, and *Lycidas*; Burke's *Speech on Conciliation with the American Colonies*; Macaulay's *Life of Johnson*, or Carlyle's *Essay on Burns*.

8. COMPOSITION. The work is based on Lewis's *Second Manual of Composition*.

9. Shakspeare's *As You Like It*, and *Julius Caesar*; Bunyan's *The Pilgrim's Progress*, Part I; Goldsmith's *The Deserted Village*; Dickens's *A Tale of Two Cities*; George Eliot's *Silas Marner*; Irving's *The Sketch Book*; Ruskin's *Sesame and Lilies*; Arnold's *Sohrab and Rustum*; Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*.

10. ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

1. ENGLISH LITERATURE. The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the

nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPEARE.** Dowden's Shakspeare Primer, Hudson's School Edition of *Romeo and Juliet*, *Hamlet*, *King Lear*, *Antony and Cleopatra*, *Coriolanus*, *The Tempest*.

13. **ENGLISH COMPOSITION.** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's *Essays*, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. The principles of phonetics are presented in simple form, and repeated practice on exercises prepared especially for this purpose is required both in the classroom and in the preparation of the lesson. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises.

and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. **ELEMENTARY GERMAN.** Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. **ELEMENTARY GERMAN.** Grammar continued. Verb forms emphasized. Easy prose reading.

D. **READINGS IN EASY NARRATIVE PROSE.** Continued drill on grammatical forms. Prose composition based on texts read.

E. **NARRATIVE PROSE AND ONE EASY COMEDY.** Reproductive translation into German. Conversational exercises.

F. **MODERN PROSE READINGS.** Reproductive translation and independent themes.

G. **SCHWEITZER-SIMONNOT'S Deutsches Lesebuch für Quarta und Tertia.**

H. **GERMAN PROSE COMPOSITION.** Pope's text-book.

I. **A MODERN NOVEL.**

1, 2, 3. **ELEMENTARY GERMAN FOR COLLEGE STUDENTS.** *Thomas's Grammar, Part 1. Leander's Traumereien. Schweitzer-Simonnot's Lesebuch.*

4. **HISTORICAL PROSE.** An essay, a novel, and a drama.

5. **PROSE COMPOSITION AND THEMES.**

6. **MODERN NOVELS.** Ebner-Eschenbach, Freytag, Sudermann.

7. **Goëthe's Dramas.**

8. **Goëthe's Prose.**

9. **THE MODERN DRAMA.** Kleist, Grillparzer, Hebbel, Hauptmann, Sudermann, Fulda.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, *Francois*.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: *Fraser and Squalr* for reference. Reading: *Francois* and *Giroud's Simple French*. *Sans Famille* (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Erckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), *Muller's Grandes Découvertes Modernes*. Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of that period. Prose; frequent reproductive exercises: letters, business and friendly, twice a week.

6. **MOLIÈRE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Precieuses Ridicules*. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* (Polyeucte (Cornelle)); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the

people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. **ELEMENTARY LATIN.**

3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulae Faciles*.

4. **SELECTED FABLES AND STORIES** from Roman history.

5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**

7, 8. **CICERO, ORATIONS AGAINST CATALINE.** A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. **CICERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in Courses 7 and 8.

10. **VIRGIL, AENEID, I., II.** Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.

11. **VIRGIL, AENEID, III., IV.**

12. **VIRGIL, AENEID, V., VI.** General review. Latin writing.

13. **LIVY.** Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.

14. **HORACE.** Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.

15. **LATIN COMEDY.** Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.

16. **TACITUS.** *Agricola*, *Germania*, and selections from the *Annales*.

17. **PLINY'S LETTERS.** The reading is accompanied by informal talks upon the life, private, social, and political, of Pliny's time. The pictures of the age given by Tacitus, Juvenal, and Pliny are compared and discussed.

18. **JUVENAL'S SATIRES.** Illustrative material of every available sort is used to interpret the text, which is made the occasion of a somewhat detailed study of conditions under Domitian. Collateral readings upon topics suggested by the text and reports on such readings are required of all students.

Decorative Art

This department offers instruction in elementary drawing and *painting*, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the

handling of materials, in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, brazing, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Evening Session of 1909-1910

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION.

GEORGE NOBLE CARMAN, A. M.
Director.
PHILIP BELL WOODWORTH, B. S., M. E.
Dean of Evening School.
EUGENE C. HALL
Registrar of Evening School.

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HERBERT EDGAR COBB, A. M.
Professor of Mathematics.
FRED A. ROGERS, B. S.
Professor of Electrical Engineering.
JOHN DEREK NIES, B. S.
Professor of Electrical Engineering.
BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics.
DIE HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.
GEORGE ALEXANDER ROSS
Instructor in Woodwork.
CHARLES EDGAR HOYT
Instructor in Foundry Work.
WILLIAM PARKER HAWLEY, B. S.
Instructor in Mechanical Drawing.
KATHERINE ISABEL INGERSOLL
Instructor in charge of Sewing and Millinery.
HORACE BERNARD MCCABE
Instructor in Machine Shop Work.
FREDERICK LESTER HAVENS
Instructor in Machine Shop Work.
VICTOR LOUIS SHERMAN
Instructor in Mechanical Drawing.
AGNES BROWN
Instructor in Cookery.
GORDEN CROWELL ABBOTT
Instructor in Machinery Drawing.
BRYANT WHITE, A. B., S. B.
Instructor in Machinery Drawing.
ALBERT SIDNEY MERRILL, S. B.
Instructor in Steam Laboratory.

OFFICERS OF INSTRUCTION.

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JOHN HENRY SMALE, A. B.
Instructor in English.

EDWARD C. WINTER
Instructor in Penmanship.

HAROLD HUDSON MORGAN, M. E.
Instructor in Applied Mathematics.

JOSEPH PHIPPIN SHAW
Instructor in Accounting.

CHARLES W. MARTIN, B. S. in C. E.
Instructor in Structural Steel Work.

CLARENCE K. ARP
Instructor in Mechanical Drawing.

MARY KANE
Instructor in Physical Culture.

GRACE LUCILE HENNECKE
Instructor in Sewing and Millinery.

CHARLES R. KOLKOW, S. B.
Instructor in Mathematics.

ARTHUR E. VAN HAGAN, B. S.
Instructor in Mathematics.

JOHN D. WALLACE
Instructor in Shop Mathematics.

MAX A. GIFFEY
Instructor in Mechanical Drawing.

EDWIN D. LEMAN
Assistant in Chemistry.

CHARLES B. KAZDA
Assistant in Mathematics.

RHODA E. DICK

ETHEL J. POND

ANNA E. SMITH

MILDRED E. STAVERS

BELLE SIMONS
Assistants in Cooking and Sewing.

WALTER E. BAUERLE

MAURICE L. OARR, B. S.

ADOLPH C. H. FENSHOLT

HARRY N. GILBERT, M. E.

WILL ORLANDO JACOBI, M. E.

RALPH H. KILNER, M. E.

JOHN D. MCGRATH

AUGUSTUS W. SHARP

OREN G. SHERMAN

RICHARD H. R. WHITEHEAD, M. E.

JOHN ZIELASKOWSKI, M. E.
Laboratory Assistants.

General Information

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, bookkeepers, firemen, nurses, stenographers and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Director and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for a week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 6 to 10 o'clock Monday, Tuesday, Wednesday and Thursday evenings from October 4 to May 19.

The Library is open from 6 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses.

I. MECHANIC ARTS.

1. Machine Sketching.....	3 terms—	Tuesdays and Thursdays.
2. Elementary Mech. Draw. 3	"	Sec. 1-3, Mon. and Wed.; Sec. 4-6, Tu. and Th.
2a Elem. Arch. Draw..... 3	"	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
3. Advanced Mech. Draw. 3	"	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Machinery Drawing..... 3	"	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
5. Patent Office Drawing... 3	"	Tuesdays and Thursdays.
6 and 7. Cabinet and Pat-tern Making.....	3 terms—	Tuesdays and Thursdays.
8. Foundry Practice..... 3	"	Tuesdays and Thursdays.
9 and 10. Mach. Tool Work. 3	"	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
11 and 12. Gear Cutting, Tool and Die Making..	3	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.

II. ENGINEERING.

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. & W., 6-8 or 7-9 or 8-10
4. Electrical Laboratory, Electrical Instruments. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4a Steam Laboratory, Heat and Work. Tu. and Th., 7.30-9.30	5a Steam Laboratory, Steam Engine. Tu. and Th., 7.30-9.30.	6a Testing Laboratory, Gas Engine Practice. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. 10 Tu. and Th., 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. 11 Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. 12 Tu. and Th., 7.30-9.30.
13 Structural Steel Work. Mon. and Wed., 7.30-9.30	14 Structural Design. Mon. and Wed., 7.30-9.30.	15 Concrete Construction. Mon. and Wed., 7.30-9.30.

III. MATHEMATICS.

1. Arithmetic.....	3 terms—	Tuesdays and Thursdays.
2. Accounting and Pen-manship.....	" "	Tuesdays and Thursdays.
3 and 5. Algebra.....	3 terms—	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Geometry.....	" "	Mondays and Wednesdays.
6 and 7. Trigonometry and Analytics.....	" "	Tuesdays and Thursdays.
8. Engineering Mathematics First year—	Autumn and Winter, Mon. and Wed.; Spring, Tues.	
9. Engineering Mathematics Second year—	3 terms, Wednesdays or Thursdays.	
10. Engineering Mathematics Third year—	3 terms, Mondays.	

IV. CHEMISTRY.

1. Practical Chemistry.....	3 terms—	Tuesdays and Thursdays.
2 and 3. Qualitative and Quantitative Analysis	" "	Tuesdays and Thursdays.

V. DOMESTIC ECONOMY.

1. Cookery.....	Autumn and Winter	Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.
2. Sewing and Millinery.....	3 terms	Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.

VI. ENGLISH.

1. Elementary.....	Tuesdays and Thursdays.
2 and 3. Intermediate & Advanced.	3 terms—Int., Tu. & Th.; Adv., Mon. & Wed.

VII. UNIVERSITY EXTENSION LECTURES.

Four Courses of Six Lectures each....Thursday evenings, October 14 to March 24.

Description of Evening Courses

Mechanic Arts

1. **MACHINE SKETCHING.** A practical course aiming to assist students in making neat projective and perspective sketches of machine parts. Special attention given to making the sketches complete as regards dimensions, finish marks, and all necessary information with the fewest possible lines and in the shortest time.

2. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

2a. **ELEMENTARY ARCHITECTURAL DRAWING.** For beginners. Lettering and instrumental practice, as applied to the design of wooden buildings. Working drawings. Sections of door and window frames. Stairs, and rules for laying out. Framing plans. Bills of material. Floor plans and elevations.

3. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 2 by more practice in machine details.

4. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 2 and 3 and experienced draftsmen.

5. **PATENT OFFICE DRAWING.** The making of clear and effective drawings to meet the requirements of "*Rules of Practice in the United States Patent Office.*"

6. **CABINET MAKING.** For beginners, cabinetmakers, and teachers of manual training.

7. **PATTERN MAKING.** For beginners, patternmakers, and draftsmen.

8. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.

9. **MACHINE TOOL WORK.** Description of the construction and operation of engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

10. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

11. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

12. **TOOL AND DIE MAKING.** Practice with the lathe, planer, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making, punching, bending, and forming dies and adjusting in punch press.

Engineering

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms. Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to use in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY.** Electrical Instrument Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY.** Direct Current Generators and Motors. Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY.** Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector. Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

5a. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

6a. **GAS ENGINE PRACTICE.** Combustion of fuels. Internal com-

bustion engines. Four-cycle engine; two-cycle engine. Details of construction of pistons, governors, valves, and throttle-regulators.

7. **ALTERNATING CURRENTS.** Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. **ALTERNATING CURRENTS.** Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reactances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10, 11, 12. Continuations of 7, 8, 9, respectively.

13. **STRUCTURAL STEEL.** Composition and Equilibrium of Forces, parallel forces and center of gravity; Statics of simple structures. Strength of Materials; Tension, compression, sheer, and flexure; Ties, columns, beams, rivets, and pins.

14. **STRUCTURAL DESIGN.** Joints, simple roof truss, plate girder, study of simple bridge, specifications. Truss bridges, dead load, live load, impact and wind stresses, computation of sections.

15. **CONCRETE CONSTRUCTION.** Lecture, laboratory, and drafting room work. Composition and properties. Construction and tests of reinforced columns and beams. Specifications and unit strains. Floor construction and design.

Mathematics

1. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

2. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. **PLANE GEOMETRY,** including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY,** including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permuta-

nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPEARE.** Dowden's Shakspeare Primer, Hudson's School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest.

13. **ENGLISH COMPOSITION.** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. The principles of phonetics are presented in simple form, and repeated practice on exercises prepared especially for this purpose is required both in the classroom and in the preparation of the lesson. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises

begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy

1. **COOKERY.** Practical work in the preparation of food, with the study of the food elements and the effect of heat upon each. Invalid cookery.

2. **SEWING AND MILLINERY.** Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English

1. **ELEMENTARY ENGLISH:** Composition and Word Study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. **INTERMEDIATE ENGLISH:** Composition and Grammar. Corresponds to elementary English in high schools. Chief object to train the student to compose sentences correctly. Covers the parts of speech, sentence structure, idioms, punctuation, and spelling. Two or more short themes each week.

3. **ADVANCED ENGLISH:** Composition and Rhetoric. Corresponds to advanced English in high schools. Object, to teach the principles of effectiveness in the use of the language and the application of these principles in theme writing. Covers whole compositions, paragraphs, sentences, and words.

Summer Session—1909

July 6 to August 14

Officers of Administration and Instruction

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GEORGE NOBLE CARMAN, A. M.
Director.

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Registrar.

OFFICERS OF INSTRUCTION.

FRED A. ROGERS, B. S.
Professor of Physics.

JESSIE LOUISE JONES, Ph. D.
Professor of German.

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Assistant Professor of English.

BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics.

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS
Instructor in Woodwork.

CHARLES EDGAR HOYT
Instructor in Foundry Work.

ETHEL PERCY ANDRUS, Ph. B.
Instructor in English.

ALPHONSO WIRTH CAVANAUGH
Instructor in Mathematics.

JUSTIN WYMAN LUDLOW, M. E., O. E.
Instructor in Mechanics.

FRED LEWIS TURNER, A. M.
Instructor in Latin.

GEORGE FREDERICK CASSELL, A. B.
Instructor in German.

VICTOR LOUIS SHERMAN
Instructor in Mechanical Drawing.

JULIA GRACE MERRILL
Instructor in Cooking.

JUDSON FISKE LEE, A. M.
Instructor in History.

LOUIS MARTIN
Instructor in Sewing.

GRACE LUCILE HENNECKE
Instructor in Millinery.

signed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, First Manual of Composition, revised edition; Lewis, Introduction to the Study of Literature; Moulton, Old Testament Stories; Shakspeare, The Merchant of Venice, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the Riverside Literature Series, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's Life of Lincoln. These books are referred to below by abbreviations.

1. Average sections cover First Manual, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover First Manual, II., and Introduction, I-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover First Manual, III., and Introduction, VI-X. Special sections abbreviate Introduction.

4. Average sections cover First Manual, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover First Manual, V., Schurz's Lincoln (133), and Warner (37). Special sections omit 37.

6. Average sections cover First Manual, VI., and The Merchant of Venice.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with the American Colonies; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

8. COMPOSITION. The work is based on Lewis's Second Manual of Composition.

9. Shakspeare's As You Like It, and Julius Caesar; Bunyan's The Pilgrim's Progress, Part I; Goldsmith's The Deserted Village; Dickens's A Tale of Two Cities; George Eliot's Silas Marner; Irving's The Sketch Book; Ruskin's Sesame and Lilies; Arnold's Sohrab and Rustum; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur.

10. ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises.

1. ENGLISH LITERATURE. The practice of composition is continued throughout the course in the form of daily summaries and masterpieces. The work of the classroom includes

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and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. **ELEMENTARY GERMAN.** Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. **ELEMENTARY GERMAN.** Grammar continued. Verb forms emphasized. Easy prose reading.

D. **READINGS IN EASY NARRATIVE PROSE.** Continued drill on grammatical forms. Prose composition based on texts read.

E. **NARRATIVE PROSE AND ONE EASY COMEDY.** Reproductive translation into German. Conversational exercises.

F. **MODERN PROSE READINGS.** Reproductive translation and independent themes.

G. **SCHWEITZER-SIMONNOT'S Deutsches Lesebuch für Quarta und Tertia.**

H. **GERMAN PROSE COMPOSITION.** Pope's text-book.

I. **A MODERN NOVEL.**

1, 2, 3. **ELEMENTARY GERMAN FOR COLLEGE STUDENTS.** *Thomas's Grammar, Part 1.* *Leander's Traumereien.* *Schweitzer-Simonnot's Lesebuch.*

4. **HISTORICAL PROSE.** An essay, a novel, and a drama.

5. **PROSE COMPOSITION AND THEMES.**

6. **MODERN NOVELS.** Ebner-Eschenbach, Freytag, Sudermann.

7. **Goethe's Dramas.**

8. **Goethe's Prose.**

9. **THE MODERN DRAMA.** Kleist, Grillparzer, Hebbel, Hauptmann, Sudermann, Fulda.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, Francois.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: *Fraser and Squair* for reference. Reading: *Francois and Giroud's Simple French*. *Sans Famille* (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Erckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), *Muller's Grandes Découvertes Modernes*. Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of that period. Prose; frequent reproductive exercises; letters, business and friendly, twice a week.

6. **MOLIÈRE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Précieuses Ridicules*. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* *Polyeucte* (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the

people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

- 1, 2. **ELEMENTARY LATIN.**
3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulae Faciles*.
4. **SELECTED FABLES AND STORIES** from Roman history.
- 5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**
- 7, 8. **CICERO, ORATIONS AGAINST CATALINE.** A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.
9. **CICERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in Courses 7 and 8.
10. **VIRGIL, AENEID, I., II.** Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.
11. **VIRGIL, AENEID, III., IV.**
12. **VIRGIL, AENEID, V., VI.** General review. Latin writing.
13. **LIVY.** Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.
14. **HORACE.** Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.
15. **LATIN COMEDY.** Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.
16. **TACITUS.** *Agricola*, *Germania*, and selections from the *Annales*.
17. **PLINY'S LETTERS.** The reading is accompanied by informal talks upon the life, private, social, and political, of Pliny's time. The pictures of the age given by Tacitus, Juvenal, and Pliny are compared and discussed.
18. **JUVENAL'S SATIRES.** Illustrative material of every available sort is used to interpret the text, which is made the occasion of a somewhat detailed study of conditions under Domitian. Collateral readings upon topics suggested by the text and reports on such readings are required of all students.

Decorative Art

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the

handling of materials, in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

1. **PHYSIOGRAPHY.** The distribution of matter in space. The celestial bodies, their number, their size, distances, materials (kinds, and amount compared with space), physical conditions, arrangement in space and motions, with emphasis on the motion of the earth and its relations to the sun and moon; elementary meteorology and climatology; oceanography. Knowledge of a certain amount of physics is involved: Density, pressure in liquids and in air, barometric phenomena, kinetic theory of gases, diffusion, properties of vapors, thermometry, change of state, transference of heat, specific heat, latent heat, atmospheric electricity. It is believed that there is economy in studying the broader principles first and their broader applications in connection with the more immediate applications in the study of physical geography.

2. **PHYSIOGRAPHY.** Constituents of the atmosphere and their relations to life; oxidation, carbonation and hydration in the belt of weathering and their effects on the atmosphere and on climate; the work of underground water in solution and deposition from solution; crystallization; soils and the relation of plants to underground water and to soil; the modern doctrines of the origin and development of the surface features of the earth, the agencies involved, the resulting forms and the great examples of these forms; a study of the topographic features of the continents. The elementary chemistry involved is studied as it is needed.

3. **PHYSIOGRAPHY.** A study of life and life processes. Especial attention is given to the distribution of life on the earth, its relation to soil, to topographic and climatic features and the control of these things over man. Frequent references are made to these subjects in the fall and winter quarters. They are here taken up in more systematic fashion.

4. **GENERAL GEOLOGY.** The elementary features of dynamical structural, and historical geology. Emphasis placed upon the leading facts and principles of the science and the more important events of geological history. For college students.

Prerequisite: *Courses 1, 2 and 3; Physics 1-3 and Chemistry 1-3, or their equivalent.*

Physiology and Bacteriology

1. **PLANT PHYSIOLOGY** and botany of food plants.

2. **PHYSIOLOGY AND PERSONAL HYGIENE.** Human anatomy and physiology from lectures, text, and illustrative material. Points of contact between the study of physiology and subjects which concern practical conduct, e. g., physical training, diet, reaction of body to immediate environmental conditions, conservation of nervous energy.

3. **BACTERIOLOGY.** A laboratory course dealing with bacteria, yeasts and molds. Studies in morphology, physiology and reproduction; making of culture media, of permanent mounts; exercises in elementary analysis of air, milk, water, etc., from different sources.

Domestic Economy

The courses in Domestic Economy are planned with reference to the needs of two classes of students: (1) Young women who are preparing to teach cooking and sewing; (2) Girls who wish to acquire a knowledge of the household arts in connection with other academy studies.

The teachers' courses in domestic economy are of college grade and presuppose a high school training. A two-year curriculum leading to the title of Associate in Domestic Economy is outlined on page 16.

Following are the courses of instruction that are offered in this department:

A. SEWING. Course designed for the younger pupils. Includes the making of plain undergarments, with talks on materials and implements used. Use of machine with simple attachments.

B. SEWING. Taking of measurements, making of undergarments continued, cutting from patterns.

C. SEWING. Cutting and making of shirtwaists, thin gowns, and dressing-sacks.

In connection with A, B, and C, four hours a week may be given to millinery.

D, E, F. SEWING. Courses designed for those who are preparing to teach; include, in addition to the sewing defined under A, B, and C, drafting, the study of textiles, and the principles of design. Simple designs in flat colors, such as borders, rugs, etc.; color harmony; lettering for monograms; proportions of the human figure; sketching from life; designs for undergarments, waists, dresses, hats, etc.

G, H, I. SEWING AND MILLINERY. A continuation of D, E, and F. Advanced sewing and millinery. Design as applied to dress. Textiles and weaving. The teaching of sewing and millinery in the elementary and the secondary school.

1, 2. COOKING. Courses designed for the younger pupils. Manufacture, selection, and preparation of food. Marketing, cooking, and serving.

3. STUDY OF THE HOUSE. A continuation of 1 and 2. Construction, furnishing, decoration and care of the house.

4. COOKING. Course designed for those who are preparing to teach. Nature and uses of food, and changes effected by heat, cold, and fermentation; uses and application of preservatives.

5. COOKING. A continuation of 4. Principles of the selection and preparation of foods. Care and manufacture of food.

6. COOKING. Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: *Courses 7 and 8.*

7. FOOD AND DIETETICS. A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry A-C.*

1. **PHYSIOGRAPHY.** The distribution of matter in space. The celestial bodies, their number, their size, distances, materials (kinds, and amount compared with space), physical conditions, arrangement in space and motions, with emphasis on the motion of the earth and its relations to the sun and moon; elementary meteorology and climatology; oceanography. Knowledge of a certain amount of physics is involved: Density, pressure in liquids and in air, barometric phenomena, kinetic theory of gases, diffusion, properties of vapors, thermometry, change of state, transference of heat, specific heat, latent heat, atmospheric electricity. It is believed that there is economy in studying the broader principles first and their broader applications in connection with the more immediate applications in the study of physical geography.

2. **PHYSIOGRAPHY.** Constituents of the atmosphere and their relations to life; oxidation, carbonation and hydration in the belt of weathering and their effects on the atmosphere and on climate; the work of underground water in solution and deposition from solution; crystalization; soils and the relation of plants to underground water and to soil; the modern doctrines of the origin and development of the surface features of the earth, the agencies involved, the resulting forms and the great examples of these forms; a study of the topographic features of the continents. The elementary chemistry involved is studied as it is needed.

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G, H, I. **SEWING AND MILLINERY.** A continuation of D, E, and F. Advanced sewing and millinery. Design as applied to dress. Textiles and weaving. The teaching of sewing and millinery in the elementary and the secondary school.

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3. **STUDY OF THE HOUSE.** A continuation of 1 and 2. Construction, furnishing, decoration and care of the house.

4. **COOKING.** Course designed for those who are preparing to teach. Nature and uses of food, and changes effected by heat, cold, and fermentation; uses and application of preservatives.

5. **COOKING.** A continuation of 4. Principles of the selection and preparation of foods. Care and manufacture of food.

6. **COOKING.** Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: *Courses 7 and 8.*

7. **FOOD AND DIETETICS.** A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry A-C.*

8. **FOOD AND DIETETICS.** A continuation of 7. Diet and dietaries. The detection of adulteration and preservatives in food.

9. **ECONOMICS OF THE HOUSEHOLD.** The cost of living and the apportionment of the income. A study of rent, fuel, light, and the like, with reference to cost and efficiency. Family budgets and their value. Methods of keeping household accounts. A special consideration of woman's changing economic position and the effect upon the family.

10. **SANITATION, HOUSEHOLD AND PUBLIC.** The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common and transmissible diseases. Lectures and reference work, field excursions. Prerequisite: *Bacteriology* 3.

History and Economics

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

A year is also given to economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. **ANCIENT HISTORY.** The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. **ANCIENT HISTORY.** The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. **ANCIENT HISTORY.** The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. **AMERICAN HISTORY.** The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, and the history of the English colonies to 1763.

5. **AMERICAN HISTORY.** The conflict between the colonies and England, with a study of the political differences between the two; the development of confederate government during the Revolution; the political and industrial growth of the United States, particularly of the West.

6. **AMERICAN HISTORY.** The beginning of sectional differences, acquisition and government of new territories; the fight for slavery extension; reconstruction and its effects; and the modern United States.

7. **EUROPE FROM THE FOURTH TO THE FOURTEENTH CENTURY.** An outline course in general European history covering the period from the Council of Nicea to the removal of the Papacy to Avignon, treating in such detail as the time will permit the civilization and institutions peculiar to the period.

8. **EUROPE FROM THE FOURTEENTH TO THE EIGHTEENTH CENTURY.** From the exile at Avignon to the close of the Seven Years' war. An outline study of the Renaissance, Reformation, Counter Reformation, Religious and Dynastic wars, and the struggle for colonial and commercial supremacy.

9. **EUROPE SINCE 1763.** The effects of the American Revolution on Europe, attempts at reform, the French Revolution, Napoleon, the Holy Alliance, reforms in England, and the unity of Germany and Italy.

10. **ECONOMICS.** The Consumption, Production, and Distribution of Wealth.

11. **ECONOMICS.** Money, Credit, and Banking; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform.

12. **ECONOMIC HISTORY SINCE 1750,** with special reference to the development of industry and commerce in the United States.

Philosophy

1. **INTRODUCTION TO PHILOSOPHY.** The meaning of the word "philosophy" as used in academic circles to-day; the nature of reflective thought as compared with ordinary thought, scientific thought, and poetic thought; the chief philosophical problems; the chief types of philosophic doctrine. [The course is open to sophomores and juniors. A certain amount of reading in psychology is presupposed and required. Students who intend to elect the course in the spring are requested to consult with the Dean of College Students at the opening of the year in order to arrange for this reading.]

English

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on pages 12 and 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is

signed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, *First Manual of Composition*, revised edition; Lewis, *Introduction to the Study of Literature*; Moulton, *Old Testament Stories*; Shakspeare, *The Merchant of Venice*, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the *Riverside Literature Series*, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's *Life of Lincoln*. These books are referred to below by abbreviations.

1. Average sections cover *First Manual*, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover *First Manual*, II., and *Introduction*, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover *First Manual*, III., and *Introduction*, VI.-X. Special sections abbreviate *Introduction*.

4. Average sections cover *First Manual*, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover *First Manual*, V., Schurz's *Lincoln* (133), and Warner (37). Special sections omit 37.

6. Average sections cover *First Manual*, VI., and *The Merchant of Venice*.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's *Macbeth*; Milton's *L'Allegro*, II *Penseroso*, *Comus*, and *Lycidas*; Burke's *Speech on Conciliation with the American Colonies*; Macaulay's *Life of Johnson*, or Carlyle's *Essay on Burns*.

8. COMPOSITION. The work is based on Lewis's *Second Manual of Composition*.

9. Shakspeare's *As You Like It*, and *Julius Caesar*; Bunyan's *The Pilgrim's Progress*, Part I; Goldsmith's *The Deserted Village*; Dickens's *A Tale of Two Cities*; George Elliot's *Silas Marner*; Irving's *The Sketch Book*; Ruskin's *Sesame and Lilies*; Arnold's *Sohrab and Rustum*; Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*.

10. ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

1. ENGLISH LITERATURE. The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the

nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPEARE.** Dowden's Shakspeare Primer, Hudson's School Edition of *Romeo and Juliet*, *Hamlet*, *King Lear*, *Antony and Cleopatra*, *Coriolanus*, *The Tempest*.

13. **ENGLISH COMPOSITION.** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's *Essays*, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. The principles of phonetics are presented in simple form, and repeated practice on exercises prepared especially for this purpose is required both in the classroom and in the preparation of the lesson. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises.

and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. **ELEMENTARY GERMAN.** Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. **ELEMENTARY GERMAN.** Grammar continued. Verb forms emphasized. Easy prose reading.

D. **READINGS IN EASY NARRATIVE PROSE.** Continued drill on grammatical forms. Prose composition based on texts read.

E. **NARRATIVE PROSE AND ONE EASY COMEDY.** Reproductive translation into German. Conversational exercises.

F. **MODERN PROSE READINGS.** Reproductive translation and independent themes.

G. **SCHWEITZER-SIMONNOT's Deutsches Lesebuch für Quarta und Tertia.**

H. **GERMAN PROSE COMPOSITION.** Pope's text-book.

I. **A MODERN NOVEL.**

1, 2, 3. **ELEMENTARY GERMAN FOR COLLEGE STUDENTS.** *Thomas's Grammar, Part 1. Leander's Traumerelen. Schweitzer-Simonnot's Lesebuch.*

4. **HISTORICAL PROSE.** An essay, a novel, and a drama.

5. **PROSE COMPOSITION AND THEMES.**

6. **MODERN NOVELS.** Ebner-Eschenbach, Freytag, Sudermann.

7. **Goëthe's Dramas.**

8. **Goëthe's Prose.**

9. **THE MODERN DRAMA.** Kleist, Grillparzer, Hebbel, Hauptmann, Sudermann, Fulda.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, François.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: *Fraser and Squair* for reference. Reading: *François and Giroud's Simple French*. *Sans Famille* (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Erckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), *Muller's Grandes Découvertes Modernes*. Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of that period. Prose; frequent reproductive exercises: letters, business and friendly, twice a week.

6. **MOLIÈRE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Précieuses Ridicules*. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* Polyeucte (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the

people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. ELEMENTARY LATIN.

3. ELEMENTARY LATIN. Selections from Ritchie's *Fabulæ Faciles*.

4. SELECTED FABLES AND STORIES from Roman history.

5, 6. SELECTIONS FROM CAESAR'S GALLIC WAR.

7, 8. CICEERO, ORATIONS AGAINST CATALINE. A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. CICEERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS. Prose writing as in Courses 7 and 8.

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15. LATIN COMEDY. Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.

16. TACITUS. *Agricola*, *Germania*, and selections from the *Annales*.

17. PLINY'S LETTERS. The reading is accompanied by informal talks upon the life, private, social, and political, of Pliny's time. The pictures of the age given by Tacitus, Juvenal, and Pliny are compared and discussed.

18. JUVENAL'S SATIRES. Illustrative material of every available sort is used to interpret the text, which is made the occasion of a somewhat detailed study of conditions under Domitian. Collateral readings upon topics suggested by the text and reports on such readings are required of all students.

Decorative Art

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the

handling of materials, in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Evening Session of 1909-1910

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION.

GEORGE NOBLE CARMAN, A. M.
Director.

PHILIP BELL WOODWORTH, B. S., M. E.
Dean of Evening School.

EUGENE C. HALL
Registrar of Evening School.

OFFICERS OF INSTRUCTION.

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics and Electrical Engineering.

HERBERT EDGAR COBB, A. M.
Professor of Mathematics.

FRED A. ROGERS, B. S.
Professor of Electrical Engineering.

JOHN DEEK NIES, B. S.
Professor of Electrical Engineering.

BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics.

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS
Instructor in Woodwork.

CHARLES EDGAR HOYT
Instructor in Foundry Work.

WILLIAM PARKER HAWLEY, B. S.
Instructor in Mechanical Drawing.

KATHERINE ISABEL INGERSOLL
Instructor in charge of Sewing and Millinery.

HORACE BERNARD MCCABE
Instructor in Machine Shop Work.

FREDERICK LESTER HAVENS
Instructor in Machine Shop Work.

VICTOR LOUIS SHERMAN
Instructor in Mechanical Drawing.

AGNES BROWN
Instructor in Cookery.

GORDEN CROWELL ABBOTT
Instructor in Machinery Drawing.

BRYANT WHITE, A. B., S. B.
Instructor in Machinery Drawing.

ALBERT SIDNEY MERRILL, S. B.
Instructor in Steam Laboratory.

OFFICERS OF INSTRUCTION.

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- JOHN HENRY SMALE, A. B.
Instructor in English.
- EDWARD C. WINTER
Instructor in Penmanship.
- HAROLD HUDSON MORGAN, M. E.
Instructor in Applied Mathematics.
- JOSEPH Phippin Shaw
Instructor in Accounting.
- CHARLES W. MARTIN, B. S. in C. E.
Instructor in Structural Steel Work.
- CLARENCE K. ARP
Instructor in Mechanical Drawing.
- MARY KANE
Instructor in Physical Culture.
- GRACE LUCILE HENNECKE
Instructor in Sewing and Millinery.
- CHARLES R. KOLKOW, S. B.
Instructor in Mathematics
- ARTHUR E. VAN HAGAN, B. S.
Instructor in Mathematics
- JOHN D. WALLACE
Instructor in Shop Mathematics.
- MAX A. GIFFEY
Instructor in Mechanical Drawing.
- EDWIN D. LEMAN
Assistant in Chemistry.
- CHARLES B. KAZDA
Assistant in Mathematics.
- RHODA E. DICK
- ETHEL J. POND
- ANNA E. SMITH
- MILDRED E. STAVERS
- BELLE SIMONS
Assistants in Cooking and Sewing.
- WALTER E. BAUERLE
- MAURICE L. CABE, B. S.
- ADOLPH C. H. FENSHOLT
- HARRY N. GILBERT, M. E.
- WILL ORLANDO JACOBI, M. E.
- RALPH H. KILNER, M. E.
- JOHN D. MCGRATH
- AUGUSTUS W. SHARP
- OREN G. SHERMAN
- RICHARD H. R. WHITEHEAD, M. E.
- JOHN ZIELASKOWSKI, M. E.
Laboratory Assistants.

General Information

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, bookkeepers, firemen, nurses, stenographers and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Director and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for a week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 6 to 10 o'clock Monday, Tuesday, Wednesday and Thursday evenings from October 4 to May 19.

The Library is open from 6 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses.

I. MECHANIC ARTS.

1. Machine Sketching.....	3 terms—	Tuesdays and Thursdays.
2. Elementary Mech. Draw	3 " "	Sec. 1-3, Mon. and Wed.; Sec. 4-6, Tu. and Th.
2a Elem. Arch. Draw.....	3 " "	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
3. Advanced Mech. Draw	3 " "	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Machinery Drawing.....	3 " "	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
5. Patent Office Drawing....	3 " "	Tuesdays and Thursdays.
6 and 7. Cabinet and Pat- tern Making.....	3 terms—	Tuesdays and Thursdays.
8. Foundry Practice.....	3 " "	Tuesdays and Thursdays.
9 and 10. Mach. Tool Work.	3 " "	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
11 and 12. Gear Cutting, Tool and Die Making..	3 " "	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.

II. ENGINEERING.

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. & W., 6-8 or 7-9 or 8-10
4. Electrical Laboratory, Electrical Instruments. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4a Steam Laboratory, Heat and Work. Tu. and Th., 7.30-9.30	5a Steam Laboratory, Steam Engine. Tu. and Th., 7.30-9.30.	6a Testing Laboratory, Gas Engine Practice. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. 10 Tu. and Th., 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. 11 Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. 12 Tu. and Th., 7.30-9.30.
13 Structural Steel Work. Mon. and Wed., 7.30-9.30	14 Structural Design. Mon. and Wed., 7.30-9.30.	15 Concrete Construction. Mon. and Wed., 7.30-9.30

III. MATHEMATICS.

1. Arithmetic.....	3 terms—	Tuesdays and Thursdays.
2. Accounting and Pen- manship.....	" "	Tuesdays and Thursdays.
3 and 5. Algebra.....	3 terms—	Sec. 1, Mon. and Wed.; Sec. 2, Tu. and Th.
4. Geometry.....	" "	Mondays and Wednesdays.
6 and 7. Trigonometry and Analytics.....	" "	Tuesdays and Thursdays.
8. Engineering Mathematics First year—Autumn and Winter, Mon. and Wed.; Spring, Tues.		
9. Engineering Mathematics Second year—3 terms, Wednesdays or Thursdays.		
10. Engineering Mathematics Third year—3 terms, Mondays.		

IV. CHEMISTRY.

1. Practical Chemistry.....	3 terms—	Tuesdays and Thursdays.
2 and 3. Qualitative and Quantitative Analysis	" "	Tuesdays and Thursdays.

V. DOMESTIC ECONOMY.

1. Cookery.....	Autumn and Winter	Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.
2. Sewing and Millinery.....	3 terms	Sec. 1, Mondays and Wednesdays. Sec. 2, Tuesdays and Thursdays.

VI. ENGLISH.

1. Elementary.....		Tuesdays and Thursdays.
2 and 3. Intermediate & Advanced.	3 terms—	Int., Tu. & Th.; Adv., Mon. & Wed.

VII. UNIVERSITY EXTENSION LECTURES.

Four Courses of Six Lectures each....Thursday evenings, October 14 to March 24.

Description of Evening Courses

Mechanic Arts

1. **MACHINE SKETCHING.** A practical course aiming to assist students in making neat projective and perspective sketches of machine parts. Special attention given to making the sketches complete as regards dimensions, finish marks, and all necessary information with the fewest possible lines and in the shortest time.

2. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

2a. **ELEMENTARY ARCHITECTURAL DRAWING.** For beginners. Lettering and instrumental practice, as applied to the design of wooden buildings. Working drawings. Sections of door and window frames. Stairs, and rules for laying out. Framing plans. Bills of material. Floor plans and elevations.

3. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 2 by more practice in machine details.

4. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 2 and 3 and experienced draftsmen.

5. **PATENT OFFICE DRAWING.** The making of clear and effective drawings to meet the requirements of "*Rules of Practice in the United States Patent Office.*"

6. **CABINET MAKING.** For beginners, cabinetmakers, and teachers of manual training.

7. **PATTERN MAKING.** For beginners, patternmakers, and draftsmen.

8. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.

9. **MACHINE TOOL WORK.** Description of the construction and operation of engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

10. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

11. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

12. **TOOL AND DIE MAKING.** Practice with the lathe, planer, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making, punching, bending, and forming dies and adjusting in punch press.

Engineering

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms. Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to use in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY.** Electrical Instrument Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY.** Direct Current Generators and Motors, Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY.** Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector. Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

5a. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

6a. **GAS ENGINE PRACTICE.** Combustion of fuels. Internal com-

bustion engines. Four-cycle engine; two-cycle engine. Details of construction of pistons, governors, valves, and throttle-regulators.

7. **ALTERNATING CURRENTS.** Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. **ALTERNATING CURRENTS.** Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reactances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10, 11, 12. Continuations of 7, 8, 9, respectively.

13. **STRUCTURAL STEEL.** Composition and Equilibrium of Forces, parallel forces and center of gravity; Statics of simple structures. Strength of Materials; Tension, compression, sheer, and flexure; Tiles, columns, beams, rivets, and pins.

14. **STRUCTURAL DESIGN.** Joints, simple roof truss, plate girder, study of simple bridge, specifications. Truss bridges, dead load, live load, impact and wind stresses, computation of sections.

15. **CONCRETE CONSTRUCTION.** Lecture, laboratory, and drafting room work. Composition and properties. Construction and tests of reinforced columns and beams. Specifications and unit strains. Floor construction and design.

Mathematics

1. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

2. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. **PLANE GEOMETRY,** including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY,** including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permuta-

tions and combinations, and the use of four and five place tables of logarithms.

6. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

7. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

8. **ENGINEERING MATHEMATICS.** Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power.

9. **ENGINEERING MATHEMATICS.** Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

10. **ENGINEERING MATHEMATICS.** Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry

1. **PRACTICAL CHEMISTRY.** The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

2. **QUALITATIVE ANALYSIS.** The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

3. **QUANTITATIVE ANALYSIS.** As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may

begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy

1. **COOKERY.** Practical work in the preparation of food, with the study of the food elements and the effect of heat upon each. Invalid cookery.

2. **SEWING AND MILLINERY.** Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English

1. **ELEMENTARY ENGLISH:** Composition and Word Study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. **INTERMEDIATE ENGLISH:** Composition and Grammar. Corresponds to elementary English in high schools. Chief object to train the student to compose sentences correctly. Covers the parts of speech, sentence structure, idioms, punctuation, and spelling. Two or more short themes each week.

3. **ADVANCED ENGLISH:** Composition and Rhetoric. Corresponds to advanced English in high schools. Object, to teach the principles of effectiveness in the use of the language and the application of these principles in theme writing. Covers whole compositions, paragraphs, sentences, and words.

Summer Session—1909

July 6 to August 14

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION.

GEORGE NOBLE CARMAN, A. M.

Director.

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Registrar.

OFFICERS OF INSTRUCTION.

FRED A. ROGERS, B. S.

Professor of Physics.

JESSIE LOUISE JONES, Ph. D.

Professor of German.

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Assistant Professor of English.

BERKELEY JOHN THOMAS, A. M.

Assistant Professor of Mathematics.

DIC HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry.

GEORGE ALEXANDER ROSS

Instructor in Woodwork.

CHARLES EDGAR HOYT

Instructor in Foundry Work.

ETHEL PERCY ANDRUS, Ph. B.

Instructor in English.

ALPHONSO WIETH CAVANAUGH

Instructor in Mathematics.

JUSTIN WYMAN LUDLOW, M. E., O. E.

Instructor in Mechanics.

FRED LEWIS TURNER, A. M.

Instructor in Latin.

GEORGE FREDERICK CASSELL, A. B.

Instructor in German.

VICTOR LOUIS SHERMAN

Instructor in Mechanical Drawing.

JULIA GRACE MERRILL

Instructor in Cooking.

JUDSON FISKE LEE, A. M.

Instructor in History.

LOUIS MARTIN

Instructor in Sewing.

GRACE LUCILE HENNECKE

Instructor in Millinery.

ROBERT FREDERICK BIESEMEIER

Instructor in Machine Shop Work.

JUDSON THOMAS WEBB

Instructor in Pottery.

ROBERT J. KERNER, Ph. B.

Instructor in History.

HATTIE C. VANATTA, Ph. B.

Instructor in Mathematics.

AGNES BROWN

Instructor in Cooking.

CHARLES B. KAZDA

Instructor in Mathematics.

LAURA E. W. BENEDICT

Instructor in English.

PAULINE GLEASON

Instructor in French.

ZOURA L. CLARK, A. B.

Instructor in Grade Work.

JOHN HENRY SMALE, A. B.

HARRIETT L. ROBERTSON

ROSAMOND M. TOWER

HELEN PIERCE

Assistants in Grade Work.

EDWIN LEMAN

LEE FRANCIS SUPPLE

Assistants in Chemistry.

ADOLPH C. H. FENSHOLT

Assistant in Physics.

JEAN BLISS

Assistant in Sewing.

General Information

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.
2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.
3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, *covering the work of each year of the high school in English, mathematics, history and foreign languages.*

4. For pupils of the sixth, seventh and eighth grades of the public school, classes are formed to do the regular work of these grades.

The tuition for the summer term for a course in one subject five hours a week of class instruction, is five dollars. In Laboratory, drawing, shop work and grade work, ten hours, or a fraction thereof, count as five in determining the tuition.

Mechanic Arts

1. **MANUAL TRAINING.** Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. **CABINET MAKING.** A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

7. **ELEMENTARY PATTERN MAKING.** Intended for students in Engineering and teachers of Manual Training.

8. **ADVANCED PATTERN MAKING.** Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

9. **FOUNDRY WORK.** The instruction in foundry work is largely individual, the complete equipment of the shop making it possible to give such work as each student desires and needs. One may specialize in cupola and furnace work, in core making, in art bronze and brass work, or in light or heavy machinery molding. Special attention will be given to a course for teachers of manual training.

5. **INSTRUMENTAL DRAWING.** A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. **PROJECTION DRAWING.** Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. **MACHINE DRAWING.** Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing.

More advanced machine design will be taught if desired.

20. **MACHINE SHOP PRACTICE.** A course embodying a study of the construction of the different machine tools with instruction in operating and keeping them in order. Practice in centering, plain, taper, and templet turning, chucking, drilling, boring, external and internal thread cutting; hand tool turning, filing and polishing. Forms of cutting tools, and instruction in grinding. Use of planer, shaper, and universal miller, and grinder; plain milling and cutting of spur and bevel gears.

Mathematics

1a. **ARITHMETIC.** An elementary course in preparation for admission to the Institute.

1. **ELEMENTARY ALGEBRA.** Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. **ELEMENTARY ALGEBRA,** four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. **CONCRETE GEOMETRY,** one day a week.

3. **ELEMENTARY ALGEBRA,** four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. **CONCRETE GEOMETRY,** one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar polygons.

6. **PLANE GEOMETRY,** completed.

10. **ADVANCED ALGEBRA.** A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. **SOLID GEOMETRY.** Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. **COLLEGE ALGEBRA.** Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

Physics and Engineering

A. **GENERAL PHYSICS.** An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

1. **ADVANCED PHYSICS.** An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

2. **ELECTRICAL LABORATORY.** The courses in this department will be arranged to suit the individual student.

Chemistry

All courses are designed to meet, as far as possible, the wants of each student.

A. **GENERAL CHEMISTRY.** Academy course.

1. **GENERAL CHEMISTRY.** College course.

4. **QUALITATIVE ANALYSIS.**

6. **QUANTITATIVE ANALYSIS.** Analysis of foods, etc.

7. **ORGANIC CHEMISTRY.** General laboratory work.

Domestic Economy

COOKING. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A. **SEWING.** Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

B. **SEWING.** Cutting and making of shirtwaists and wash dresses. Four hours a day.

History

1a. **UNITED STATES HISTORY.** An elementary course in preparation for admission to the Institute.

1. **GREEK HISTORY,** from the Persian wars to the death of Philip of Macedon.

2. **ROMAN HISTORY,** from the Punic wars to the death of Caesar.

3. **ENGLISH HISTORY,** from the Norman conquest to the present time.

4. **UNITED STATES HISTORY.** An advanced course with special at-

tention to the sources and formation of the Constitution, its operation, and the history of political parties.

5. The History of Europe since 1815, based upon Robinson and Beard's Development of Modern Europe, Vol. II.

English

A. READING, GRAMMAR, AND COMPOSITION. A course in elementary English in preparation for admission to the Institute.

1. LITERATURE AND COMPOSITION. A review of the required English of the first year.

4. LITERATURE AND COMPOSITION. A review of the required English of the second year.

7. LITERATURE. The "study-books" required for college entrance in 1909.

9. LITERATURE. The "reading-books" required for college entrance in 1910.

German and Latin

Such elementary classes as may be necessary to meet the demands of the students in attendance.

Pottery

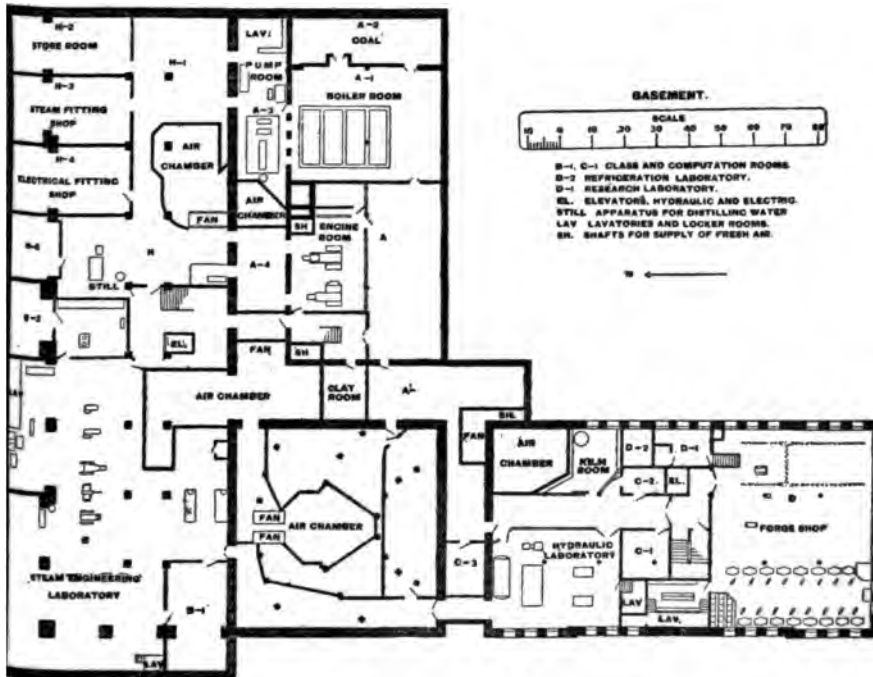
The production of artistic pottery. The instruction will be adapted to the needs of teachers.

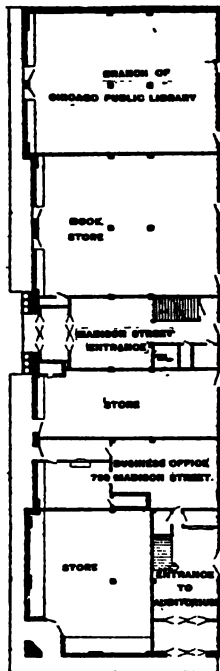
Buildings and Plans

The buildings are fire-proof structures of brick, sandstone, terra-cotta, and steel, and have been erected at a cost of four hundred thousand dollars for buildings, and one hundred and fifty thousand dollars for equipment.

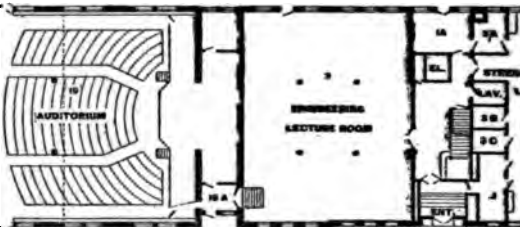
The Arts Building, at the corner of Madison and Robey streets, is a six-story structure; the Engineering Building, on Robey street, has seven stories, and the Gymnasium, in the rear of the other buildings, has two stories. A high, well-lighted basement occupies the entire space covered by all the buildings and the alleys which separate them.

Both the Engineering and the Arts Buildings are supplied with elevators and the most approved appliances for heating and ventilation, and are equipped with all apparatus needed for the successful accomplishment of the work that has been undertaken.





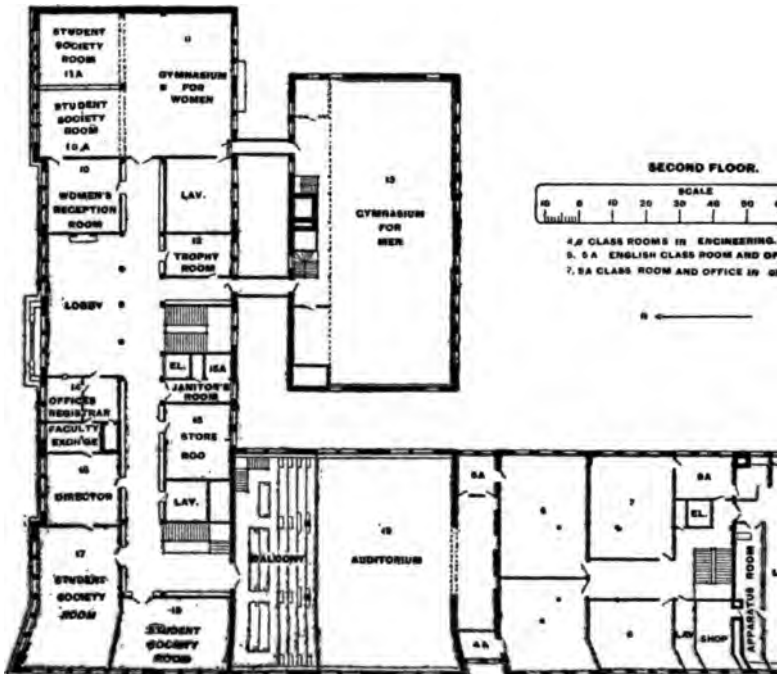
PRIVATE ALLEY.



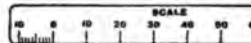
FIRST FLOOR.



1 OFFICE OF DEPARTMENT OF
2, 3A STAGE ENTRANCE TO AUDITORIUM
ENT. ENTRANCE TO ENGINEERING DEPT.
LAV. LAVATORIES AND LOCKER ROOM



SECOND FLOOR.



4A CLASS ROOMS IN ENGINEERING.
5, 5A ENGLISH CLASS ROOM AND OFFICE
7, 7A CLASS ROOM AND OFFICE IN SE.



Laboratories

The *Dynamo Laboratory* is on the third floor of the engineering building. The equipment includes one 33-kilowatt direct current motor; sixteen direct current motors in sizes up to 5 horse-power; one 35-light arc dynamo; one 30-kilowatt three-phase alternator; one 5-kilowatt two-phase alternator; one 7.5-kilowatt, one 6-kilowatt, and three 5-kilowatt rotary converters, provided with switchboards so arranged that the machines can be operated as plain alternating current or direct current generators or motors, or as converters; two 2-horse-power single-phase induction motors; one 3-horse-power and two 1-horse-power three-phase squirrel-cage motors; one 5-horse-power three-phase variable speed induction motor mounted on a cradle dynamometer, and available as an induction motor, generator, or regulator, as a three-phase transformer, and as a frequency changer; one 1-horse-power variable speed three-phase induction motor; four 2.5 kilowatt transformers with connections for two-phase three-phase transformation; six 5-kilowatt transformers with a wide range of voltages; one 30,000-volt testing transformer; one constant current series arc transformer with lamps; one constant current arc regulator; a large number of indicating instruments, potential and current transformers, artificial transmission lines, motor compensators, resistances, reactances, condensers, etc.

The *Mechanical and Strength of Materials Laboratory* occupies one-half of the first floor of the engineering building. This laboratory is arranged for work of various kinds. In the equipment are a Reeves variable speed counter-shaft, a Thurston oil tester, a 6-horse-power gas engine, an Ericsson hot air engine, and gauges, indicators, and other instruments employed in operation and test. Here also are the following testing machines: A 200,000-pound Olsen, a 40,000-pound Riehle, a 1½-inch by 4-foot Olsen torsion, a Keep dead load, a Keep impact for cast iron, and a 2,000-pound Fairbanks for cement. The equipment for *Surveying* is kept in this Laboratory. A bank of steel wire lock-

ers contains transits, levels, sextants, compasses, barometers, and other field equipment sufficient for ten parties in surveying.

The *Hydraulic Laboratory* is situated in the north end of the basement of the engineering building. It is equipped with weighing, pressure, and weir tanks, rotary and reciprocating pumps, Pelton wheel, hydraulic ram, and the necessary instruments and tools.

The *Steam Laboratory* is situated in the basement of the arts building. It is arranged for work in compressed air, ammonia, and steam. Included in its equipment are a 30-horse-power return flue boiler, arranged for natural or induced draft; an 8 by 20-inch Harris Corliss engine; a 10-kilowatt Kerr steam turbine generator unit; a 7 by 12 inch Straight Line engine and two smaller experimental engines; a surface condenser; an air and ammonia compressor in connection with a half-ton refrigerating system; two large air tanks capable of withstanding 1,200 pounds pressure per square inch; several makes of steam injectors; water measuring tanks, scales, brakes, indicators, calorimeters, gauges, and other instruments employed in making tests on engines and boilers. For standardizing pressure gauges and indicator springs there is a 50-foot mercury column.

The *Department of Physics* has two especially equipped lecture rooms with stereopticons, hydraulic lifts, pressure gauges, vacuum gauges, illuminated-dial electrical instruments, and recording hygrometer and thermometer. The lecture tables are provided with water, gas, compressed air, steam, vacuum pumps, and electricity.

The rooms for the use of the department are: General physics laboratory, apparatus and preparation rooms, photometric rooms, private workroom, advanced laboratory, and electrical measurements room. In the advanced physics laboratory each table is provided with slate-lined fuse boxes, from which different currents for use in testing may be obtained. The reference library is supplied with a large assortment of books on the subjects of Physics and Electricity. The photometric room is equipped with Lummer-Brodhun and Flicker photometers, and standard lamps.

The workroom is in charge of a competent mechanic, and is equipped with a drill press, an eight-inch Rivett precision lathe

with attachments for milling, grinding, and screw-cutting, a Walker grinder, and numerous hand tools.

The laboratories are fully equipped with apparatus for quantitative work in general physics and electricity. Some of the more recent additions to the outfit for work in light are the following: A Schmidt and Haensch spectrometer, a Schmidt and Haensch polariscope, a Michelson interferometer, and a Newton lecture-room polariscope.

The electrical equipment consists of standards of resistance, capacity, self-induction, and electromotive force; resistance boxes, bridges, galvanometers, and electrometers from Nalder Brothers & Co., Elliott Brothers, and Hartmann & Braun; also dynamometers, voltmeters, and ammeters of various types and ranges. A twelve-inch induction coil furnishes an important part of the equipment. Specially designed switchboards are placed in the general physics laboratory and in the advanced laboratory.

The working equipment used for calibration and tests consists of modern commercial machines, such as water motors, water meters, vacuum pumps, hydraulic rams, heat motors, photometers, electric motors, voltmeters, ammeters, recording wattmeters, arc lamps, electric stoves, bridges, condensers, shunts, and discount meters.

The apparatus in the engineering laboratories is also available for use in the department of physics.

The *Department of Chemistry* occupies the west half of the fifth floor of the arts building. The lecture room has a seating capacity of three hundred. The laboratories for general, qualitative, and organic chemistry are equipped with water, gas and electric current, and contain hoods exhausted by electrically driven fans. The apparatus for the above courses is complete and modern. The quantitative and research laboratories are equipped with all the ordinary apparatus desirable for such work, including Sartorius and Becker balances. They also contain many more complicated pieces, such as combustion, assay, combustion furnaces, Troemner assay balance, Parr's calorimeter, Bunsen's gas calorimeter, Browning spectroscope, Bausch and Lomb microscope, Abbe refractometer, Schmidt and Haensch polariscope, thermostat, Sargent's carbon combustion apparatus, apparatus for gas and oil analysis and for electrolytic de-

terminations. The supply of chemicals is abundant and varied. The department library includes the best American, English, German, and French reference works and the current American and English periodicals.

The *Geographical and Geological Laboratory* equipment includes the following: A nearly complete set of the topographical atlas sheets of the United States Geological Survey; United States Coast and Goedetic Survey charts and Geological folios; Mississippi and Missouri river charts; pilot charts of the Atlantic and Pacific Oceans; weather maps and charts; relief globe of the earth; relief maps of the continents; relief maps of the United States and of selected localities; collections of common rocks and minerals; several hundred lantern slides; Laing's plantarium, Morse's heliodon, and a four-inch refracting telescope; tables and facilities for molding topographical features; books of reference.

The *Biological Laboratory* has demonstration table with sink and gas supply; laboratory tables with individual lockers; thirteen compound microscopes; sixteen dissecting microscopes; the usual supply of glassware, reagents, etc.; mounted human and animal skeletons; charts; collections of preserved animal and plant specimens and dissections, of microscopic preparations, of lantern slides, of reference books.

The *Bacteriological Laboratory* is furnished with tables having water and gas supply and individual lockers with the usual apparatus; also with incubators, Arnold's sterilizer, hot-air sterilizer, other apparatus, books of reference. The same laboratory contains additional lockers and equipment for the class in household chemistry.

The two *Cooking Laboratories* have each individual accommodations for classes of sixteen students, and the usual kitchen equipment for cooking and serving in larger quantities.

Shops, Drawing Rooms, Sewing Rooms, Etc.

The *Elementary Woodshop* is on the fifth floor of the engineering building and is arranged to accommodate four classes of eighteen each. This shop is for hand work only. The benches are similar to those in the pattern shop, and are equipped with the necessary tools. Seats are arranged so that the students can

be given class instruction by practical demonstration and by lectures in which the stereopticon can be used. Special tools and supplies are kept in the tool room. The locker room is arranged with individual lockers.

The *Wood Turning Shop* is situated between the elementary wood shop and the pattern shop, and is equipped with eighteen lathes of various sizes and makes and the requisite tools and appliances. The lathes are driven by a ten-horse-power motor. Lockers for the students' work are located along one side of the shop. The locker and wash room opens off the shop.

The *Pattern Shop*, on the fifth floor, is arranged to accommodate four classes of sixteen each. It is equipped with eight double benches, each side of a bench having a locker in which the tools used by the students in general are kept, and four locked drawers in which are kept the edged tools used by individual students. The machines in the pattern shop are one 24-inch 12-foot, and three 16-inch 6-foot overhanging spindle lathes; two 12-inch 5-foot, and two 11-inch 4½-foot speed lathes; one 24-inch surface planer; one universal circular cut off and rip saw; one 36-inch band saw; one grindstone; one emery tool grinder; one trimmer, and one sand-papering machine. The band and circular saws and the planer are driven by individual electric motors. The lathes are driven from two line shafts, each one of which has an independent motor.

Special tools and supplies are kept in the tool room, and tools are issued to students on check. Conveniently located are a dry kiln and a room in which unfinished work is kept. An office and a class-room open off the shop.

The *Advanced and Elementary Machine Shops* are on the fourth floor and occupy two separate rooms. The shop at the north end of the building is for elementary machine work, and the south shop is for advanced work. Between the two shops and communicating with both is the tool and stock room, where all small tools and supplies are kept.

The equipment of the *Elementary Machine Shop* consists of one 12-inch 5-foot plain engine lathe; one 12-inch 5-foot engine lathe with draw chucks, taper attachment, and compound rest; three 14-inch 6-foot and one 15-inch 6-foot engine lathes, with taper attachments and compound rests; seven 14-inch 6-foot plain

engine lathes; two 12-inch 4-foot speed lathes; one 15-inch friction geared shaper; one 16-inch crank shaper; one No. 1½ Universal miller; one 18-inch drill press; one double-wet emery tool grinder; and sixteen vises, placed on a bench running along two sides of the shop. Near the entrance stands a case of small lockers in which the students keep their work and individual tools. The machines in this room are driven by a ten-horse power electric motor attached to the ceiling.

The *Advanced Machine Shop* is equipped with one 18-inch 12-foot engine lathe, with compound rest; one 26-inch 8-foot, and one 15-inch 6-foot engine lathe, with taper attachments; one 16-inch 8-foot engine lathe, with taper attachment and compound rest; one 14-inch 6-foot toolmakers' lathe, with taper and backing off attachments, compound rest, and draw chucks; one 12-inch 4-foot speed lathe; one No. 3 back geared screw machine, with wire feed; one No. 2 universal miller, with slotting and rack cutting attachments; one No. 3 universal miller, with universal vertical and circular attachments; one 12-inch by 30-inch universal grinder; one 26-inch rack shaper; one 24-inch by 24-inch by 6-foot planer; one 24-inch back-geared drill press; one 13-inch sensitive drill press; one No. 3 inclinable punching press; one combination emery wheel and disc grinder; one wet emery tool grinder; one universal cutter grinder; one circular metal cut-off saw; eight vises placed on wood benches along the walls on two sides of the shop, and three vises on iron benches on the erecting floor and among the machines. All the machines in this shop are driven by independent direct current electric motors, so connected as to give the necessary variations in speed. A one-ton 16-foot hand-power traveling crane, mounted in the center of the shop so that it can traverse the whole width of the building, provides for the handling of heavy work and parts of the machines and tools. In the tool room are kept the general tools and cutter holders belonging to the machines, all the small tools, scales, standard gauges, measuring instruments, supplies, and general stock used in the work of the shops. The tool room is in charge of an attendant, who, by means of the check system, issues tools to students as they are needed in the work. A class room and office open off the shop.

The Forge Shop, in the basement of the engineering build-

ing, is well lighted by windows on three sides. The equipment consists of one large forge for steam hammer work; one gas tempering forge; one brazing forge; one 200-pound steam hammer; one angle bender; one eye bender; one bolt header; anvils, forges, and tools for a class of sixteen in ordinary forge work. A 12-foot hand-power traveling crane handles large work for the steam hammer, large forge, and heating furnace. The smoke from the forges is taken away through down draft hoods by a 60-inch steel exhaust fan, and the blast is supplied by a 24-inch blower, both of which are driven by a 15-horse power motor. A post drill, a double emery grinder, and a power hack-saw are driven from a separate motor. A stock room and a class room open off the shop.

The *Foundry*, on the sixth floor of the engineering building, is well lighted from skylights in the roof and by windows in the side and end.

The molding floor is made of cedar block placed on end; the floor around the cupola and furnaces is of brick. There are places for sixteen students, each place having a molding floor and a bench, and each bench an equipment of shovel, riddles, rammers, bellows, and molders' small tools.

There is a well equipped core room with two core ovens, one heated by gas for small cores, and the other, 6 feet wide by 10 feet long by 7 feet high, heated by coke and equipped with a car 4 feet wide by 6 feet long. A track for the car runs under the crane for handling large cores and dry-sand molds. There are two permanent and two portable brass furnaces with a combined capacity of 800 pounds, and two cupolas, one a 16-inch, hung on trunnions, and the other, a 24-inch, standing on the floor. A one-ton 16-foot traveling crane with electric hoist covers the main floor of the foundry. The equipment includes a cleaning room with tumbling barrel, and a flask and pattern shop with 12-inch wood lathe. The machinery is driven by a 5-horse power motor.

A class room and office open off the foundry. A pattern storage room 20 feet by 60 feet opens off the charging platform. All the equipment with the exception of the motors and fan was built in the Institute shops.

The *Rooms for Drawing and Design* are in the engineering building, four on the sixth floor, two on the fifth floor, and one

on the fourth floor. They aggregate about five thousand square feet of floor space and are amply lighted and furnished. Their proximity to the foundry, pattern, and machine shops, makes it possible to co-ordinate, to an unusual degree, the design and the constructive branches.

The blue-print room is on the mezzanine floor above the sixth, and is approached through a drawing room on the sixth floor. It is equipped with a 40 by 52 inch curved glass blue-print machine, tracing files, and blue-print baths.

On the sixth floor of the Arts Building are ample accommodations with overhead light for the work in freehand drawing.

The *Pottery Rooms* are equipped for the manufacture of pottery as well as for giving instruction. The class room has modeling tables and wheels driven by electric motor. In the laboratory and kiln room are two kilns, chemicals, glazes and a glaze mill. The clay room is supplied with clays and a clay mixer.

The *Sewing Rooms* are four in number, situated on the sixth floor of the Arts Building, with overhead light. The largest room has accommodations for sixty students. The machine room is supplied with thirteen sewing machines, electric iron, and mirrors and screens for fitting. The millinery room accommodates twenty students, and is furnished with show-cases, models, etc. One of the sewing rooms contains a loom, a spinning wheel, and other apparatus provided for the work in textiles.

Lunch Rooms. There are three lunch rooms. Two of these are on the fifth floor of the Arts Building, adjoining the Cooking Laboratories. Lunch is prepared under the direction of the instructors in cooking, and is served at very reasonable charges. A large room is reserved on the first floor of the engineering building for such men as choose to bring their lunch. In this room only milk, chocolate and broth can be bought.

Libraries

The main library consists of about seventeen thousand volumes, and about three thousand pamphlets, selected with immediate reference to the needs of each department. It is essentially a working library, containing all necessary reference works, together with representative books in the various sec-

tions of history, biography, literature, fine arts, engineering, mathematics, physics, chemistry, philosophy, philology, and sociology. One hundred and sixty-three periodicals are currently received.

Throughout the school year the libraries are open from eight A. M. to five P. M.; during the session of the night school the hour for closing is nine P. M. The students at all times have free access to the shelves. Library assistants serve in turn at the reference desk and assist in making the students familiar with the arrangement of the books and the use of the dictionary catalogue. The catalogue is a clear, simple guide to the resources of the library, free from confusing technicalities. The Dewey system of classification is used, with Cutter book numbers.

Students in Attendance, 1908-9.

The names of students taking evening or summer courses are not included in these lists.

College Students

The figures after the names indicate the number of courses of instruction completed without conditions at the close of the year ending in August, 1909, above and beyond the fifteen admission units.

Engineering College Students

Adams, Clyde	34	Ferrell, Dent	4
Ahrens, Walter Robert	26	Filkins, Earl	36
Anderson, Wilbur Clarence..	9	Ford, John Gerard	22
Atwater, Harry	15	Forster, Henry	22
Avery, Harold	5	Frydendall, Archie Danforth	3
Bacon, Malcolm	15	Gibbs, Charles Amory	14
Baker, George	12	Golden, Walter	10
Bang, Homer William	36	Goldsmith, Roy Douglas	13
Bannister, Harold DeVillo...	7	Goss, LeRoy	36
Barber, Robin Henin	25	Harvey, Arthur Homer.....	32
Bartik, Edward	12	Hauber, Clemens	18
Bassett, Cyrus White	26	Hauswald, Alois	2
Benjamin, Merrill	3	Havens, Fred	31
Biesemeier, Robert Frederick	12	Heath, William Clarkson....	13
Bonnell, Marvin Young	4	Hildebrandt, George	12
Bowes, Lawrence Cecil	4	Hill, Vernon Orville	9
Brand, Paul	23	Hoadley, George Lee	31
Brayton, Merle Victor	6	Hochstadter, Benjamin	3
Bronson, Clifford	4	Hodges, Albert	28
Burke, Henry James	24	Hunter, Dundas	10
Bush, George Chester	22	Iverson, Roy	2
Carpenter, Charles Irving...	32	Jacobi, Will Olando	36
Charlton, James	14	Johnson, George Lester	9
Collette, John Richard.....	2	Kaindl, Arthur	27
Connelly, Harry	24	Kaiser, Everett Dee	22
Curtis, Arthur John Ramage.	30	Kane, Paul	25
Dammann, Arthur	8	Kidder, Walter	33
Dempsey, Ewald	12	Kilner, Ralph Hammond ...	42
Donaldson, Jacob Crawford..	9	Klamt, Edward	15
Dykstra, John Edward	24	Klein, William Frederick...	23
Edwards, Lester Richard....	9	Kline, Howard Dodson	6
Elszner, John	12	Kuehne, Alfred	39
Etnyre, George Mortimer....	13	Larsen, Elmer Carl	8
Feely, Frank	17	Leman, Edwin	16
Fensholt, Adolph C. Herlev..	3	Loeding, George	18

STUDENTS IN ATTENDANCE.

67

nzen, William	12	Rosseland, Frederick Martin	3
n, Walter John	12	Russell, Emerson	1
r, Roscoe	6	Schaedel, Victor Emil.....	12
u, Fred Anthony	8	Schrader, Paul	6
rath, John Daily	21	Seyferlich, Edgar Philipp... 6	
enet, Francis Xavier....	27	Sharp, Augustus William, Jr. 32	
r, Arthur	12	Sherman, Oren Gray.....	40
e, Roy Stehman	38	Shewmon, Dan	25
e, Wesley Carpenter....	4	Small, Elmer Stiles.....	27
s, Frank Edward.....	24	Smith, Warren	12
elson, Robert Theodore. 9		Strauss, Edward Emil.....	23
gfell, Ralph Marshall... 23		Sumkowski, Alfons Julius... 14	
ee, Theron	13	Tischer, Arthur Herman Vic. 8	
er, Harry Fox	8	Tull, Mark Eugene.....	29
w, Arthur Raymond... 32		Uhlhorn, Walter	32
son, Harvey Emanuel.. 26		Wade, Frank Harrison.....	36
rick, Fred	9	Walker, Fred Gale.....	15
e, Irving Harry.....	3	Wallace, John Dwyer.....	36
r, John	12	Warner, Charles	6
ehus, James Arthur... 15		Wyman, Lawrence West.... 24	
ell, Joseph Murray.....	24	Zielaskowski, John	36
nson, Pratt	17	Zitzewitz, Walter	17
rs, Frank Ely	9		

Science and Arts College Students

ns, Gladys Madeleine... 10	Dick, Rhoda Ellen.....	20
, Nellie	Dickinson, Fred Wilton....	10
strong, Mary	Dimmitt, Margaret Beatrice. 14	
ld, Esther Margaret....	Dicker, Edith May.....	20
ld, Zella Bilderback....	Dohnal, Ignaz	20
s, Elizabeth Farnan....	Dorman, Beth	1
win, Ella Louise.....	Dreffein, Robert	18
s, Gertrude Elizabeth.. 3	Drummond, Ethel Reynolds. 2	
dict, Lloyd George....	Eastman, Helen	12
iger, Otto William....	Ebersole, Amanda	9
man, Adele	Elszner, Louise.....	9
strom, Emil	Farnsworth, Editha	10
e, Ella Winifred.....	Farrell, Grace Leone.....	21
her, Fannie Amanda....	Ferris, Phoebe Ruth.....	18
obell, Ada Estelle.....	Fliegenbaum, Helen	8
rholt, May	Fitts, Maygene	18
, Willma	Forster, Ilse	19
s, Sarah May	Froelich, Crissie Mae.....	19
n, Bernhard	Gansbergen, Marguerite E... 23	
, Michael	Gaynor, Kathleen Marie....	22
in, Louise Mirrah....	Gillespie, Georgie Marguerite 9	
ts, Isabella Wallace....	Gleason, Pauline	13
nan, Ruth	Goodman, May Isabelle....	18
ingham, Martha Isabella 24	Graham, Gay	6
ing, Thurber Wesson... 5	Green, Annie Isabel.....	19
ng, Grace	Griswold, Catherine	10
y, Doris Alice.....	Hackshaw, Hazel	18
s, Nellie Helene.....	Haines, Thomas Lloyd	12
s, Sarah Mabel.....	Hannan, Helen Adelaide....	6
er, Anna Frances.....	Hansen, Merritt Rasmus....	3
raw, Orley Andrew.....	Hartmann, Anna	8

Hatch, Elizabeth	11	O'Brien, Sarah	10
Hautau, Emma	6	Ochs, Arthur John	6
Hill, Landry	6	Olson, Oscar William	22
Hoffman, Clara Louise.....	3	Osbornson, Caroline Edith..	7
Holbo, Mary	10	Oswald, Alma Minnie	14
Hood, Clara Louise.....	10	Palmer, Eugenia	32
Hooper, Mildred Estelle.....	2	Patrick, Elizabeth Louise..	20
Ingersoll, Blanche	10	Patrick, Ruth Ballantine..	18
Jaffe, Ida	2	Patton, Caroline Frances ..	8
Johnson, Edith Geneva.....	6	Paulsen, Hannah Mabel ..	18
Jones, Alice Lloyd	20	Phelps, James Manley ...	8
Jones, Bessie Gardner.....	10	Pierce, Cornelia	9
Jones, Ethel Grace.....		Pierce, Helen	29
Jones, Laura	8	Pinger, Grace Marie	10
Kemmerling, Edith	28	Pond, Ethel Jean	10
Kazda, Charles Bohumel.....	6	Roberts, Dorothy Bradley..	9
Keeler, Anna Estelle.....	25	Robertson, Percival	4
Keeler, Martha	8	Rogers, Mary	10
Kietzer, Waldemar Weimar. 6		Root, Helen Morley	27
King, Carrie	4	Rossland, Emily Jennie ..	10
King, Ethel	18	Roth, Helen	10
Kinney, Frances, Edna.....	20	Rundell, Forrest Preston ..	14
Kirkland, Curtis Hobart....		Sailor, Helen	1
Kittilsen, Klara	18	Schofield, Mary	15
Kohout, Jerome Francis.....	14	Schutz, Dorothy Leah	12
Kruger, Ada Rowena	11	Shafer, Mary Etta	31
Kuderna, George Jerome....	9	Shelly, Pearl	10
Langworthy, R. Steinbrecher	18	Skiles, Florence	10
Leach, Mildred	5	Sloan, Charles Mills	6
Livengood, Frances Marie... 4		Smith, Anna Elizabeth ...	21
Loeding, Sophie	9	Snow, Jane Belle	9
Lovely, Eleanor Julia.....	8	Stavers, Mildred Evelyn ..	22
Lowry, Robert Henry.....	11	Stewart, Louise	12
Markowitz, Morris	6	Stubings, Ruth Victoria... 18	
Martens, Elsbeth Louise.....	18	Titus, Robert Virgil	10
Martin, Gail Ellsworth.....	3	Tonneson, Louise	9
Martin, Verna Kirk.....	8	Turnbull, Florence	20
Mather, Jennie	22	Turner, Evelyn Isabel	20
McDonnell, Grace Dorothy... 9		Ullrick, Helen May	11
McNaul, DeEtta Armina....	11	Weyand, Louise Anna	13
Mix, Ella Evelyn.....	19	White, Mabel Frances	18
Montgomery, Marie Ada.....	9	Williams, Ella Crane	7
Moody, Marie Agnes.....	5	Winkelman, Laura	18
Morgan, Mae	8	Winkler, Elsie Margaret ..	18
Murphy, Kenneth Wayne ... 3		Wintermeyer, Elsa	6
Nagl, Marie	12	Wood, Helen Gale	18
Nelson, Clara	8	Worthington, M. LaGrange.. 21	
Nicol, Jessie	10	Wylie, Beulah Edna	19
Nicholson, Alice	10	Yaxley, Leona Della	19
O'Brien, Janet	8		

Unclassified College Students

Aiken, Robert	Klingstedt, John Adolph
Barr, Jennie Louise	Kodak, Saadi
Blatchford, John	Lampert, Henry Herman
Bliss, Jean (Mrs.)	Lynch, William Enright
Bond, Rebecca	Mason, Claire
Booth, Maurice Sheldon	McFarland, Jane Ethel
Bose, Pavitra Kumar	McLean, Millicent Carey
Bourgeois, Borel Oscar	Moyle, Bennett
Burg, Bernhard	Niederman, Malvina Dorothy
Carlile, Helen	Phillips, Helen
Carlson, Harvey John	Piggot, Cora
Chatterjee, Kittish Chandra	Price, Zaidee Cusler
Chittenden, Thomas	Ronshausen, Clara
Darnall, Allen	Scollay, Robert
Datta, Joges Chandra	Scott, Mrs. L. J.
Dewey, Harold Jeffers	Shepherd, Stella
Ebert, Selma	Sherman, Parsi Ram
Eldredge, William Strickland	Smith, Aaron Kinzie
Freeman, Margaret	Smith, Clara
Furstenberg, Belle	Smith, Gertrude Cave
Garland, Walter Evans	Smith, Stanley
Gentner, Lydia (Mrs.)	Stromberg, Alice
Graves, George	Thompson, John Leslie
Gross, Edward	Vokoun, Violet
Haase, Edith Pauline	Watkins, Abner
Hall, Mildred	Welch, Mary Eldora
Harris, F. G. (Mrs.)	Wheeler, Raymond
Hill, William Ely	Williams, Grace Louise
Hubbard, Gertrude Ayer	Williams, Jeanette Agnew
Juhnke, Albert Joseph	Winchell, Arthur Benjamin
Juhnke, Mary	

Academy Students

The figures after the names indicate the number of units completed at the close of the year ending in August, 1909. For definition of unit, see page 13.

Abbott, Lawrence Howard ..	5	Baker, Margery	
Abram, Milton	8	Baldwin, Raymond	10
Ahlswede, Ruth	5	Balph, Charles Francis	6
Allan, James Ramsay	6	Baragwanath, Cecil	4
Aller, Elsie	15	Baragwanath, Ruth Emily...	7
Allyn, Homer Holland	10	Barber, Phil Chase	15
Alsip, Ruth	4	Barler, Richard Candon	8
Ammentorp, George Christian	4	Barr, Marjorie	15
Anderson, Andrew John Al..	11	Bartelt, William	4
Anderson, LeRoy Christ.....	8	Bartik, Charles	15
Anspach, Elita Esther	3	Barton, Lucy Adalade	15
Arnold, Emily	5	Bassett, Gertrude	11
Axelson, Lester Martin	3	Bates, Joseph Anthony	12
Bagby, Robert Bartlett	8	Bates, Sidney Eaton	8
Baggott, Russell Lewis	15	Becker, Albert Raymond ...	12
Bain, Force, Jr.	4	Becker, Augustina Irma	2

Becker, Minnie	3	Conley, John Patrick	3
Becker, Leslie Willard	4	Cook, Querin Henry	8
Behrens, Paul Ellsworth ...	3	Corliss, John Lester	12
Bennett, Fern	2	Corrigan, Arthur James	4
Benson, Mildred	15	Corwin, Sylvia	8
Bentley, Harry Aldridge....		Costello, William John	2
Bernard, Harvey		Cox, Arthur	8
Bilek, Joseph	12	Crafton, Helge Rudolph	8
Bliter, Halsey Carl	9	Craig, Allen Arnold.....	5
Birdsall, Elsie	12	Cravens, Ben Harrison	8
Birkhoff, David Edward	10	Cravens, Worth Townsend... 12	
Birkhoff, Gertrude	3	Cremer, Henry August	5
Blackman, Gladys	11	Crile, Dennis Rider Wood... 15	
Blandin, Sherman	5	Curtis, Roswell Goodrich... 10	
Blanding, George Harvey ...	9	Curtis, Sidney Barber	3
Blezinger, Helen Ruth	12	Dabrowski, Lothar Earl	3
Bomash, Lillian Beatrice... 3		Da Costa, Harold	11
Boon, Loyal Danley		Dale, David	11
Boulton, Florence Edith	9	Dale, Russell Charles	10
Bradley, Eleanor	4	Dame, Louis	8
Brandenburg, Walter	3	Davey, Bruce	15
Breckan, Harris	8	David, Walter Woodbury.... 10	
Brenton, Robert Redfield ... 12		Davidson, Bruce Jordan	6
Breyer, Charles Conrad, Jr.. 7		Davidson, Isabelle	15
Breyer, Hazel	7	Davies, Glenn Harrison 15	
Brill, John Leonard	15	Davis, Paul Newhall	6
Brown, Cecil Aunger	10	De Clements, Muriel	5
Brown, Sherwood Eklund ..	9	Dee, Dorothy	4
Buchwald, William George ..	6	De Jong, Carroll Stone 12	
Burnham, Constance	11	Denemark, Anton	
Burroughs, Mary Evelyn	4	Dickson, Cyril Bernard	15
Burroughs, Studley Oldham.. 8		Dickson, Royal	12
Bushspies, Hazel Marie	6	Dierssen, Hulda	3
Bye, Herbert William	12	Dieterle, William	2
Byers, Edith Philinda	5	Dietz, Lydia	6
Cahill, James Raymond		Dodge, Louie Burton	11
Campbell, Stuart MacMurray 6		Dodge, Douglas Raymond ... 15	
Carden, Joseph John	9	Doetsch, Oscar Philip	11
Carey, Charles Henry	12	Doheny, Harold James	11
Carlson, Frederick August... 4		Doktorsky, Philip	15
Carlson, Harry Joseph	12	Downey, Joseph Adams	6
Carlson, Martin	12	Drake, Irene Emily	7
Carney, Peter Walter	3	Drews, Hedwig Augusta	7
Caugherty, Hazel Marie	6	Drinkaus, Frederick William 4	
Cavanagh, Marguerite	2	Duffy, Russell	3
Chamberlain, Rebecca	12	Duke, Lucy	14
Chamberlain, Paul Wheelock 3		Dummer, James Byron	12
Chandler, Warren Bruce....		Duzenski, Helen	2
Charleston, Joseph	4	Dyrenforth, Dorothy	15
Childs, Leslie Oliver	8	Dzwoniarek, Victor	5
Chittick, Howard		Edleman, Pincus	
Chilville, Leslie Lenox	3	Edstrom, Edward	10
Chmelik, Frank Joseph	6	Eggers, Elmer Wm. Clarence	
Christensen, Norman Victor. 8		Ehrhardt, Alwin William ... 15	
Clark, Leonard Dudley	4	Ehrhardt, Edna Sophia	4
Clasen, Herman	15	Ehrlich, Ralph	2
Condit, Harold Schribner... 8		Elchelman, William Harold. 7	

STUDENTS IN ATTENDANCE.

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um, Julius	3	Green, Harold Elsey	3
Leo Jess	7	Grey, Charles Gossage	2
roothy Helen	15	Grunow, William	1
Albert	8	Gurley, Gladstone	12
Robert Frederick	4	Gurney, Irene	10
Ruth	4	Guy, Robert Brown	4
gust Ingo	4	Gyllenhaal, John Renade	15
rthur	8	Haase, William Wilbert	2
Samuel Webster	2	Haeger, Milton Otto	6
William		Hagemann, Ernest	10
Edward	2	Hagg, Arthur Harry	3
Joseph	6	Hagstrom, Harry Oscar	10
Jacob	2	Hall, Howard Gage	3
Otto Bernhard	4	Hamer, Leo	3
Emma	5	Hammon, Julia	9
Marguerite	5	Hansen, Elmer Adolph	2
Charles Walter	10	Hansen, Walter Harry	4
Harry James	7	Hardin, Leslie James	2
d, Mildred	15	Harding, Roy Adelbert	2
Arthur Joseph	12	Harris, Christine	10
exander	15	Haskin, Charlton Charles	3
erry Aloysius	2	Hatterman, Florence	7
George William	1	Hay, Elwood Harvey	4
aymond	15	Hazelton, Frank Benjamin	6
erick	6	Hazelwood, Paul Joseph	15
Murrel	15	Heffron, Arthur	13
Hulda	7	Heffron, Helen	11
Dick	6	Heggle, Barbara Frances	6
rry	3	Hench, Ralph	15
arguerite Eliza	12	Henderson, Alexander Swift	15
Edward Louie	6	Hennessey, Guy	1
Maide	4	Henning, Carola	4
Cella Martin	12	Hepp, Emil Jacob	10
Merritt Campbell	13	Herle, Frank Leonard	7
John Franc	3	Herlofson, Clarence	6
Frederick Clem	2	Heron, Margaret	1
arold	5	Herrick, Helen Powers	14
Helen Edith		Herrmann, Leon Charles	9
Domenick	3	Hess, Carleton White	11
William Gustave	8	Heywood, Harold William	11
Julia Victoria	4	Hibbard, Charles Alexander	4
abel	11	Hildebrandt, Edward	8
alter John	4	Hobler, Fred Otto	8
gnes White	6	Hoffman, Edward	3
adish	5	Hoffman, Harry	8
Frank Thomas	8	Hoffmann, Erna	3
erving August	12	Holabird, Mary Hinsdale	11
xander Clinton	12	Holden, William Henry	8
rence Edward	12	Hollatz, Elsie	3
Howard	6	Howe, Irene Gladys	5
George Bernard	8	Howe, Ruth Elizabeth	8
Thomas Jefferson	8	Hoyt, William Pritchard	6
Frances Irene	2	Huckins, Nellie Cydne	7
Harriett	4	Hughes, Tempa	6
Albert Fred	7	Hulbert, Slade Williamson	3
ilton Henry	5	Hunter, Thomas Russell	6
William	2	Hunton, Stanton Charles	6
lan Ethel	8	Hurckes, Bartholomew, Jr.	8

Hurford, Norman	1	Krabol, Signy Octavia	10
Huth, Emma Frances	6	Kramer, Gertrude	11
Ilett, Dorothy	9	Krebs, Alice Dorothy	2
Ilett, Marie	15	Kreuder, Norman William ..	5
Irwin, Mildred	2	Kreuter, William	5
Jacobi, Edwin	7	Kroeschell, Paul Herman ..	8
Jaffe, Joseph	6	Krum, George Adelbert	2
Jandus, Robert Cyril	13	Kryl, John Francis	2
Jenkins, Edna May	3	Kuehl, Henry	4
Jensen, Edward	6	Kuester, George Carl	7
Jevne, Verna Alice	8	Kuhnen, Peter Karl	3
Johns, Marian	5	Kuhnen, George Proctor ..	4
Johnson, George Alvin	10	Kupsch, Arno Walter	9
Johnson, Corinne Frances ...	4	Lammert, Olive Madeleine ..	8
Johnson, William Floyd		Lamoreaux, Rene	8
Johnson, Harry Charles	6	Landon, Thomas Ellsworth ..	2
Johnson, Marshall Chase	13	Lane, Marie Ruth	7
Johnson, Robert Ulysses	12	Lane, James Warren	10
Johnston, William	11	Langan, John Arthur	12
Johnstone, Walter Knox	8	Lange, Salvatore	4
Jones, Warren Gilman	11	Larsen, Reginald Lester	15
Juergens, Ada	15	Latimer, John Charles	12
Juhnke, Leokadia Matilda ...	15	Lavin, Milward Alexander ..	
Junge, Winfred	10	Lesser, Samuel	1
Kahn, Saul Arthur	10	Levin, Charles	4
Kalish, Clara	2	Levy, Flora	3
Kalvelage, Joseph Robert	4	Levy, Jerome Bertrand	5
Kamfner, Joseph	6	Lewis, Vernon Allen	3
Karpen, King Morris	10	Liese, Henry Albert	3
Kase, Henry Michael	8	Lindrooth, Janet	11
Keenan, John, Jr.	2	Linehan, Alberta Louise ...	8
Kehm, Walter Gilbert	8	Lively, John Cornelius	5
Kelley, Florence	3	Lockington, Herbert John ..	3
Kemnitz, Henry	8	Longley, Dwight Hixson	15
Kendrick, Isabel Street	9	Lott, Grundy Frances	
Kidder, Adella Louise	15	Loudon, William Hodge	10
Kieser, Freda	2	Ludwig, Pearl Ethel	6
Kiesler, Edward	3	Ludwigs, Arthur Charles ..	4
Kiest, Florence Emma	8	Luhnnow, Christian Elmer ..	7
Kiest, Lloyd George	10	Luhnnow, Walter Frederick ..	12
Kimmet, Olive	6	Mable, Don	8
Kinny, Charles	10	MacDonald, Annie Shaw ..	3
Kipp, Fred	12	MacPherson, William John ..	8
Kirk, Elizabeth	8	MacVicar, James Stephen ..	9
Kistenbroker, Irma Henrietta	12	Madson, Alice Bertha	12
Klank, Charles Edward	4	Magnus, Albert, Jr.	7
Klein, Carl	2	Magnus, Marie	9
Knox, Florence	9	Magnusson, Lawrence	3
Koch, Carl Fred. William ..	9	Mann, Edwin Judson	11
Kokes, Joseph	15	Mann, Marjorie Ridpath ..	11
Kolacek, William John	6	Manson, Margaret	
Kool, Doris Elaine	7	Marks, Arnold	
Kool, Vera Mae	9	Marnell, Catherine	7
Koop, Margarete Emily	11	Marsh, Clifford Millington ..	4
Kopf, Hazel Catherine	3	Marsh, Ethel Augusta	5
Kornbrodt, Joseph	11	Martens, Walter Ralph Leslie	4
Korup, Bertha	4	Martin, Charles Edward ..	2

STUDENTS IN ATTENDANCE.

73

Raymond Patrick....		Newell, Laurence Plympton. 6	
Robert Sackett 11		Newman, Leon 6	
Archie Edward 2		Nielsen, Elker Rosehill..... 6	
saws, Lucile 3		Nielsen, Esther 1	
n, Jane Grey 3		Nielsen, Johanna Margaret.. 3	
r, Raymond George... 4		Nielsen, Walter Ivan..... 2	
Irma Edith Virginia... 10		Nieman, Byron Weasa 12	
Mildred Teresa 2		Nigro, Rocco 4	
n, Elizabeth 3		Nilsen, Edmund 1	
nahan, Alice May.... 8		Noa, William 15	
nahan, Bayard Glenn.. 4		Nordahl, Evelyn 4	
nahan, Miles Fletcher. 6		Norris, Katherine 8	
mott, Edward 2		Novak, Otto Edward 3	
ald, John Dunn..... 4		O'Brien, George Francis 8	
ald, Marguerite 12		O'Brien, Ruth Catherine 12	
re, Desmond 15		Oestmann, Ethel Marie 8	
r, Stuart 8		Ogden, David Batchelder.... 8	
, Eustis Ewart 13		Ogden, Frank Edmund 3	
stry, Bennett Dandy.. 2		Ogus, Edward 2	
on, James Alan 11		Olds, Grover Edwin 5	
ster, Alva 5		Olsen, Terrence Oliver..... 4	
ster, Ruth Marie 15		O'Neill, Eugene 7	
l, Harold Edwin 4		Oveson, Emil 7	
ty, Thomas Joseph.... 9		Painter, Walter 7	
g, Carl Gustav 4		Parker, Walton 10	
er, Nathalie 3		Parks, Clarence Runyan.... 11	
l, Henrietta Caroline.. 15		Parsley, Mamie Nutt 3	
w, Nina 7		Paskind, Jacob 3	
schelm, Henry Fred... 2		Paulk, Marie Lucinda 15	
Edna Marie 4		Peake, Frederick Burbank.. 15	
William Fred 5		Pearse, Harold 4	
lsen, Robert 9		Pedersen, Arthur 4	
lsen, Stella Maria 2		Perrill, Alger 15	
Benjamin Harry.... 5		Peterson, Albert George 3	
Ella Lorraine 15		Peterson, Louis Andrew 4	
in, Sidney 5		Peterson, Theo. Waldemar.. 15	
Harry 5		Peterson, Arvid R. Leonard. 5	
Louis 11		Peterson, Dagmar Marie.... 2	
r, Walter John 5		Peterson, Elmer Leroy..... 4	
Marlin 8		Petrie, Gertrude 5	
ouse, Harry Gilbert... 12		Phillips, Harvey 4	
n, Thomas 4		Phillis, Joy Adele 6	
, Helen 8		Phimister, Orrin Potter.... 8	
Edgar Clayton 11		Pilat, Gertrude Helen 7	
n, Henry Harper 11		Pinkert, Martha 2	
n, Herbert Lewis.... 15		Piper, Warren Jerome 7	
n, Wesley Hillman.... 4		Pollitz, Fred Joseph 2	
George 7		Pontious, Clara Ethel 7	
r, Jacob Edward 3		Porter, Edwin Margraff 10	
r, Louise Ruth..... 1		Powers, William Francis.... 15	
vay, Gertrude 4		Prendergast, John Morris... 8	
Kathryn 15		Preston, William Douglass.. 7	
, Anna Louise 6		Price, William Henry 15	
, George Howell 8		Prosser, Treat Dickinson... 9	
, Marie Josephine.... 12		Prout, John 6	
, Mary 5		Puster, Dumas Eugene 15	
nn, Francis Nicholas. 6		Puster, Margaret Emrich... 12	

Putz, Ethel	4	Schultz, Amy Marie	3
Radnitzer, Adolph	15	Schumacher, Arthur	9
Raithel, Andrew George	15	Schwartz, Samuel	11
Rand, Esther	3	Schwinn, Frank	3
Rankin, Ray Emerson	3	Scott, Clifford Allen	8
Raymer, Alice	15	Scott, Charles Edward	7
Raymer, Ellen May	8	Seligman, Samuel	6
Rayspis, James Thomas	13	Seneco, Roy Eugene	12
Reck, John	3	Sexton, Alice	11
Reed, Esther	8	Sheardown, Rex Winton ..	15
Rehm, Arthur William	2	Shopera, Henry Nathan	6
Reichel, Albert Sunderlin....	10	Shrader, Harold Shaw	4
Reinhardt, Charles Henry....	9	Siegel, David	3
Richards, Marmet Austin....	8	Silverman, Meyer Joy	7
Richardson, Howard Mills....	10	Simons, Erskine Phelps ...	15
Riddiford, Rubie	2	Simons, Rose	2
Rieser, Leonard Joseph	11	Skillin, Harry Millard ...	3
Ringler, George Frederick....	4	Sladek, Edward Frank	4
Rittenhaus, Roy Lewis.....		Slocum, Caryl	5
Roberts, Harold McNally....	1	Smith, Clarence Phillip ...	6
Roble, Lester Frank	4	Smith, Mary Ethel Lourdes ..	8
Robinson, Myra	15	Smith, Harold Kellogg	12
Robinson, Raymond Dudley..	7	Smith, Helen	8
Roe, Maurice	2	Smith, Morton Edwin	6
Roeschlaub, Genevieve Sharer	8	Snyder, Clifford Walter ...	15
Rojahn, Edna Alberta	12	Soelke, Elsa Dorothy	15
Roos, Louis		Soest, Alfred August	8
Root, Aloysius James		Soest, Martha Lydia	4
Rose, Harold Emanuel.....	5	Sommerfield, Nate	15
Rose, Waldo John Albert....	15	South, Donald Corbly	15
Ross, Harold McBain.....	7	Southwick, Elizabeth	9
Roszbach, Cora Margaret....	3	Spengler, Mabel May	2
Roth, Ella Margarite	1	Splehr, Segrid Enola	4
Roth, Walter Sherman	8	Spies, Philip Matthew	12
Royer, Harry	8	Spitzer, Edith	4
Rubenstein, Joseph	6	Springer, Martha Helen....	2
Rubenstein, Nathan	15	Springer, Walter William ..	9
Ruehl, Elvira Justine.....	12	Stark, Frank	12
Russell, John Albert	9	Stein, Lucile	5
Russell, Edward Gordon....	3	Stephens, Harold Alfred ..	12
Russell, Nellie Marie	7	Sternberg, Ella	2
Rutherford, John Joseph ...	11	Steuer, Joseph True	6
Ryther, Henry White	12	Stevenson, David Robert ...	7
Salisbury, Howard Darius....	15	Stewart, George Ross	7
Sand, John Andrew, Jr.....	5	Stieber, Joe	7
Sandell, Enoch	5	Stirton, James	6
Sanders, Carl	4	Stoddard, Edna	2
Sanders, Henry August	9	Stoddard, Edward Woodham	15
Savage, George Edward	8	Stoll, Walter	15
Saxon, James Christian....	11	Street, Helen Delia	15
Scarborough, John Barret....	13	Street, John, Jr.	3
Schaye, Paul	7	Strickland, Robert Tiras....	7
Schick, Anna	4	Stromberg, Emil Alfred....	2
Schmidt, Nell May	12	Stromberg, Eva	5
Schoeninger, Adolph	8	Stucker, Urban Lucas.....	4
Schrader, John Herman	8	Sturges, Frank, Jr.	8
Schreiber, Edna	2	Sullivan, Desmond Thomas ..	

STUDENTS IN ATTENDANCE.

75

n, Harry John.....	15	Wade, Lois Claudine	11
n, Paul D.	1	Wadsworth, Francis Wheeler	2
n, Paul F.	7	Waechter, Julius Henry.....	3
Lee Francis	15	Wagner, Elsbeth Beatrice....	15
n, Charles	8	Wahl, Arnold Spencer	15
t, Harry	5	Walduck, Lorna	8
dano, Alexander	10	Walker, Fenno	3
s, Henry	3	Wallace, William Alfred, Jr..	10
Forrest Charles	4	Walther, Charles Brock	10
Hazel Emma	15	Warloe, Elinor	7
John Luther	9	Warren, Homer Samuel	13
Charles John	11	Weigand, Albert Philip	15
ton, Kenneth Stuart..	15	Well, Martin	7
Eric Blaine	4	Weinberg, Benjamin	4
ld, William	4	Weinhardt, Walter Ralph	8
Edward Gustave	6	Welse, Sidney William	15
s, Edwin Benjamin...	8	Wellman, Lottie Marle	2
s, Patrice Jessie	7	Wells, Katherine	12
s, Walter	2	Wessling, Leon Frederick ..	4
son, Dorothy Cella ...	5	Westfall, Mildred Storey ...	15
son, Walter Thomas..	6	White, Laura Fraser	4
on, Earl Sanderson...	5	White, Lloyd	6
Harold Earle	13	Whitley, Ralph	3
Frank	10	Whitney, Mabel	5
Richard	3	Wiener, Hildegard	5
n, Margaret Agatha..	9	Wilcox, Bernice May	2
Lawrence LeValley..	16	Williams, Margaret Florence	15
Libbie Josephine....	6	Wilson, Oscar James	11
Herbert Octavius.....	3	Wilson, Stuart James	7
, Louis	11	Winberg, Henry Edward	3
, Charles Arthur.....	11	Winkler, Louis Rudolph	1
Charles Henry	15	Wise, Frank John	9
e, Thomas Park.....		Wishart, Harold William ...	2
kloot, Adrian Merinus	9	Wolff, George Frederick.....	4
ek, Edward Joseph... 10		Wolfson, Ida	4
Glenn Fish	15	Woodhall, William Horton ..	3
Clarence	10	Worthmann, Estella	6
l, Elvira Amanda....	12	Wright, George Reed, Jr....	8
ling, Harry Henry... 10		Yaxley, William Ernest	10
, Sidney William....	3	Zielaskowski, Frank	15
s, Charles	3	Zoeller, Josephine Augusta..	2
Fred	15	Zuckeman, David	
Louis	10		

Students in Co-operative Course in Mechanic Arts

Boys and Employers

s, Newton, Aermotor any.	Cotter, James, Link Belt Com- pany.
, Merrill, Allis-Chalmers any.	Doskocil, Edwin, Union Special Machine Co.
d, Clarence, F. Cortez n & Co.	Eggers, Elmer, E. Goldman & Co.
i, Roger, Temple Pump any.	Erhard, Edward, Hanna Engi- neering Works.
James, Link Belt Com-	Erlick, Ralph, Woods Motor Veh- icle Co.

Fork, William, Acme Steel Goods Company.
 Gould, Russell, Sullivan Machinery Company.
 Grunoer, Paul, Acme Steel Goods Company.
 Hall, John, Allis-Chalmers Company.
 Hanna, John Clark, Hanna Engineering Works.
 Hitchcock, Frank, Aermotor Company.
 Hyde, Leroy, Goodman Manufacturing Company.
 Johnson, Frank, H. W. Caldwell & Sons Co.
 Kelsey, Russell, Union Special Machine Company.
 Krueser, Robert, Temple Pump Company.
 Legg, Robert, Allis-Chalmers Company.
 Linderman, Arthur, Sullivan Machinery Company.
 Lindquist, Elmer, Weller Manufacturing Company.
 MacDougal, Robert, Allis-Chalmers Company.

Meyer, Carl, Union Special Machine Company.
 Michaels, Charles, H. W. Caldwell & Sons Co.
 Moe, Sverre, Latham Machinery Company.
 Mooney, John, Latham Machinery Company.
 Nilson, Arthur, Weller Manufacturing Company.
 Rabez, William, Link Belt Company.
 Schroeder, Fred, Aermotor Company.
 Schubert, George, Goodman Manufacturing Company.
 Testal, Harvey, Aermotor Company.
 Thomas, Willard, F. Cortez Wilson & Co.
 Thurn, Walter, E. Goldman & Co.
 Valdes, Lawrence, Woods Motor Vehicle Company.
 Whittell, Floyd, E. Goldman & Co.

Unclassified Academy Students

Boys

Barker, Walter Reginald
 Barnard, Robert Edgar
 Barnbrock, Adolph
 Benjamin, John
 Bradbury, Arthur Rexford
 Brooks, Nathan Harry
 Chan, Fung Chee
 Clover, Harvey Frederick
 Davidson, Arthur Edwin
 Dyrenforth, Lucian
 Elliott, Claude
 Faust, Clyde Ambrose
 Fischer, Philip
 Geannellis, Aristides
 Hansen, Valdemar Edward
 Hart, Erick Howell
 Hills, William
 Hofmann, William
 Johnson, John Harry
 Kelley, John
 Konczyk, John
 Marshall, William Seba
 Mason, Fred
 Mercll, Adelard

Mills, David
 Mulock, Lester
 Norton, Raymond Putnam
 Otley, Walter Adolph
 Padden, William Eugene
 Peterson, Arthur Emanuel
 Robinson, Ralph Walte
 Robinson, Thomas Joseph
 Rundell, Harry
 Schoening, Comp
 Shaviro, Nathan
 Stuckenberg, Alfred Lee
 Suy, Ho Chung
 Thomas, George
 Whipple, John Grant
 Whitehead, Eugene Earl

Girls

Abraham, Rose
 Abramovitz, Celia
 Bailey, Gladys Queen
 Bain, Mabelle Rose
 Barton, Louise
 Baumgartner, June
 Baxter, Mildred

STUDENTS IN ATTENDANCE.

77

Beatty, Pearl
Berkowitz, Amy
Bernstein, Mildred
Beuttel, Clara
Bolter, Edith
Bolter, Inez
Brannum, Marjorie
Brody, Adeline
Busse, Clara
Carlson, Alma
Carlson, Jennie
Caters, Gladys
Cline, Pauline Marie
Dahner, Eva Sidonia
Deane, Edna
Dolan, Norma
Doty, Mabel
Duffy, Valeria Gertrude
Dungan, Jean
Gieske, Amalia
Gollnick, Caroline
Hatch, Florence
Hendenreith, Mamie Anna
Herdrich, Adella
Hochstadter, Florence
Hudson, Marguerite Florence
Johansen, Elinor
Johnston, Anita Edith
Jones, Hazel
Judd, Charlotte Beverley
Kandlik, Lillian

Karger, Rosalie
King, Leona May
Kramer, Mable Olson
Langdon, Beulah
Langhorst, Clara
Lindgren, Ellen
Lundquist, Emily
Lyons, Mary Kearney
MacNaughtan, Emma
Mallon, Ruth
Manson, Annie May
Norman, Florence Irene
Parks, Dora Ruth
Peters, Elsa
Pierce, Gertrude Marian
Plantin, Minnie
Plouzek, Ida
Skala, Helen
Smith, Hazel
Speck, Mabel Carolina
Speck, Maud Elizabeth
Tope, Mary Jane
Topinka, Mary
Triplett, Helen
Vollrath, Clara
Walther, Jessie
Ward, Josephine
Ward, May
Wilber, Loretta Josephine
Wolfinger, Edna
Young, Marie Hazel

Summary of Attendance, 1908-09

Students in Day Classes.....	1386
College Students	338
Engineering Students (Men)	115
Science and Arts Students	162
Men	29
Women	133
Unclassified Students	61
Men	31
Women	30
Academy Students	835
Classified	726
Boys	521
Girls	205
Unclassified	109
Boys	40
Girls	69
Summer Students (not counted above)	213
Boys	74
Girls	139
Students in Evening Classes	1340
Engineering Students (Men)	381
Mechanic Arts	339
Men	333
Women	6
Mathematics	274
Men	251
Women	23
English	100
Men	67
Women	33
Domestic Economy	237
Cooking (Women)	123
Sewing (Women)	114
Chemistry	56
Men	53
Women	3
Pottery	32
Men	6
Women	26
Physical Culture (Women)	30
Total Evening Students	1449
Deduct Students Counted Twice	109
Total Day and Evening Students	2726

University Extension Lectures.

The University Lecture Association announces the following lectures at Lewis Institute.

THE NAPOLEONIC PERIOD IN EUROPE. By Henry Morse-Stephens, A.M., Professorial Lecturer in History.

October 14.—The Consulate in France, 1799-1804.

October 21.—Establishment and Extension of the Napoleonic Empire, 1804-10.

October 28.—The Grand Army; Napoleon as a General.

November 4.—The Administration of the Napoleonic Empire; The Court of Napoleon.

November 11.—The Napoleonic Period in Europe and the Rise of the Nations.

These lectures deal with the Napoleonic Empire in Europe rather than with the Biography of Napoleon or the Empire in France, and are based upon the latest phase of Napoleonic literature.

THE SOCIAL MEANING OF THE NOVEL. By Percy H. Boynton, A.M., Assistant Professor of English.

November 18.—Between Two Centuries: Jane Austen.

November 23.—Social Democracy: Charles Dickens.

December 2.—Social Integrity: William Makepeace Thackeray.

December 9.—Social Emancipation: Nathaniel Hawthorne.

December 16.—The New Estimate of Woman: George Eliot.

December 21.—The New Individualism: George Meredith.

SOCIAL WASTE. By Ira Woods Howerth, Ph.D., Assistant Professor of Sociology.

January 6.—Land Fraud and Land Monopoly.

January 13.—The Use and Abuse of Our National Resources.

January 20.—The Waste of Competition.

January 27.—The Social Cost of Disease.

February 3.—Loss of Life in the Dangerous Trades.

February 10.—The Social Waste of Child Labor.

**THE ORIGIN AND HISTORY OF COMMON LAND FORMS. By
Wallace Walter Atwood, Ph.D., Assistant Professor of
Physiography and General Geology.**

**February 17.—The Fantastic Features of the Landscape: A Study
of the Processes of Weathering and Soil-making.**

**February 24.—River Valleys: A Study of the Work of Running
Water, Including Gullies, Ravines, Glens, Dales, Gorges, and Canyons.**

**March 3.—River Valleys, *continued*. The Growth of Valleys
through Youth to Maturity and Finally to Old Age. The Final Reduc-
tion of a Country to Approximately Sea Level.**

**March 10.—Shoreline Features: A Study of the Work of Waves
and Shore Currents.**

**March 17.—Land Forms Due to the Ancient Ice Sheets of North
America: A Study of the Glacial Period.**

March 24.—Volcanoes.

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CALENDAR

1910														1911													
JANUARY							JULY							JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	..	..	1	..	..	..	..	..	1	2	..	1	2	3	4	5	6	7	..	..	..	..	..	1	..
2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14	2	3	4	5	6	7	8
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21	9	10	11	12	13	14	15
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28	16	17	18	19	20	21	22
23	24	25	26	27	28	29	24	25	26	27	28	29	30	29	30	31	..	..	..	..	23	24	25	26	27	28	29
30	31	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..	..
FEBRUARY							AUGUST							FEBRUARY							AUGUST						
..	..	1	2	3	4	5	..	1	2	3	4	5	6	..	..	1	2	3	4	5	..	..	1	2	3	4	5
6	7	8	9	10	11	12	7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12
13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19
20	21	22	23	24	25	26	21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26
27	28	..	..	..	..	..	28	29	30	31	..	..	..	26	27	28	..	..	..	27	28	29	30	31	..	..	..
MARCH							SEPTEMBER							MARCH							SEPTEMBER						
..	..	1	2	3	4	5	..	..	..	1	2	3	4	..	..	1	2	3	4	5	..	..	..	..	1	2	..
6	7	8	9	10	11	12	4	5	6	7	8	9	10	5	6	7	8	9	10	11	3	4	5	6	7	8	9
13	14	15	16	17	18	19	11	12	13	14	15	16	17	12	13	14	15	16	17	18	10	11	12	13	14	15	16
20	21	22	23	24	25	26	18	19	20	21	22	23	24	19	20	21	22	23	24	25	17	18	19	20	21	22	23
27	28	29	30	31	..	..	25	26	27	28	29	30	..	26	27	28	29	30	31	..	24	25	26	27	28	29	30
APRIL							OCTOBER							APRIL							OCTOBER						
..	..	..	..	1	2	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	2	3	4	5	6	7
3	4	5	6	7	8	9	2	3	4	5	6	7	8	2	3	4	5	6	7	8	8	9	10	11	12	13	14
10	11	12	13	14	15	16	9	10	11	12	13	14	15	9	10	11	12	13	14	15	15	16	17	18	19	20	21
17	18	19	20	21	22	23	16	17	18	19	20	21	22	16	17	18	19	20	21	22	22	23	24	25	26	27	28
24	25	26	27	28	29	30	23	24	25	26	27	28	29	23	24	25	26	27	28	29	29	30	31	..	..	..	..
..	..	..	..	..	..	..	30	31	..	..	..	..	..	30	..	..	..	..	..	..	..	..	..	..	..	..	..
MAY							NOVEMBER							MAY							NOVEMBER						
1	2	3	4	5	6	7	..	1	2	3	4	5	6	..	1	2	3	4	5	6	..	..	1	2	3	4	..
8	9	10	11	12	13	14	6	7	8	9	10	11	12	7	8	9	10	11	12	13	5	6	7	8	9	10	11
15	16	17	18	19	20	21	13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18
22	23	24	25	26	27	28	20	21	22	23	24	25	26	21	22	23	24	25	26	27	19	20	21	22	23	24	25
29	30	31	..	..	..	..	27	28	29	30	..	..	..	28	29	30	31	..	..	..	26	27	28	29	30	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
JUNE							DECEMBER							JUNE							DECEMBER						
..	..	..	1	2	3	4	..	..	..	1	2	3	..	..	..	1	2	3	..	..	..	..	1	2	3	4	..
5	6	7	8	9	10	11	4	5	6	7	8	9	10	4	5	6	7	8	9	10	3	4	5	6	7	8	9
12	13	14	15	16	17	18	11	12	13	14	15	16	17	11	12	13	14	15	16	17	10	11	12	13	14	15	16
19	20	21	22	23	24	25	18	19	20	21	22	23	24	18	19	20	21	22	23	24	17	18	19	20	21	22	23
26	27	28	29	30	..	..	25	26	27	28	29	30	31	25	26	27	28	29	30	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..

Institute Calendar—1910-1911

1910—

- Sept. 5-17, Monday to Saturday—Registration of incoming students.**
- Sept. 19, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.**
- Sept. 26, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1909-1910.**
- Oct. 3-7, Monday to Friday, Evenings—Registration and Classification of candidates for Admission to Evening Classes.**
- Oct. 10, Monday—Evening Classes begin.**
- Nov. 24-25, Thursday and Friday—Thanksgiving Recess.**
- Dec. 16, Friday—Autumn Quarter ends.**

HOLIDAY RECESS FOR TWO WEEKS.

1911—

- Jan. 2, Monday—Winter Quarter begins.**
 - Feb. 22, Wednesday—Washington's Birthday—A Holiday.**
 - March 24, Friday—Winter Quarter ends.**
- QUARTERLY RECESS FOR ONE WEEK.**
- April 3, Monday—Spring Quarter begins.**
 - May 18, Thursday—Evening Classes end.**
 - June 17, 24, Saturdays, from 9 A. M. to 1 P. M.—Preliminary Examinations for Admission.**
 - June 23, Friday—Spring Quarter ends.**
 - July 3, Monday—Summer Session begins.**
 - July 4, Tuesday—A Holiday.**
 - Aug. 11, Friday—Summer Session ends.**
 - Sept. 4-16, Monday to Saturday—Registration of incoming students.**
 - Sept. 18, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.**
 - Sept. 25, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1910-1911.**
 - Oct. 2-6, Monday to Friday, Evenings—Registration and Classification of Candidates for Admission to Evening Classes.**
 - Oct. 9, Monday—Evening Classes begin.**
 - Nov. 23-24, Thursday and Friday—Thanksgiving Recess.**
 - Dec. 15, Friday—Autumn Quarter ends.**

CORPORATION

OFFICERS

CHRISTIAN CECIL KOHLSAAT

President

THOMAS KANE

Vice-President

JOHN McLAREN

Secretary and Treasurer

TRUSTEES

BERNARD ALBERT ECKHART

THOMAS KANE

OLIVER HARVEY HORTON

CHRISTIAN CECIL KOHLSAAT

JOHN McLAREN

BOARD OF MANAGERS

BION JOSEPH ARNOLD

EDMUND JAMES JAMES

GEORGE NOBLE CARMAN

HARRY PRATT JUDSON

BERNARD ALBERT ECKHART

THOMAS KANE

JAMES BRYAN HERRICK

CHRISTIAN CECIL KOHLSAAT

OLIVER HARVEY HORTON

JOHN McLAREN

ADDISON ELDRED WELLS

GEORGE NOBLE CARMAN, *Director*

WILLIAM HERBERT HALL, *Business Manager*

Officers of Administration and Instruction

ADMINISTRATIVE OFFICERS

GEORGE NOBLE CARMAN, A. M.
Director

EDWIN HERBERT LEWIS, Ph. D.
Dean of College Students

ALEXANDER WILLETT MOSELEY, S. B.
Head of Department of Engineering

HELEN DOUGAL STREET, A. M.
Dean of Women Students

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Registrar

OFFICERS OF INSTRUCTION

(The names in each group appear in the order of appointment to the group.)

EDWIN HERBERT LEWIS, Ph. D.
Professor of English

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics

CLARENCE ELBERT DUPUY, B. S.
Professor of Machine Construction

ALEXANDER WILLETT MOSELEY, S. B.
Professor of Mechanics

WARREN RUFUS SMITH, Ph. D.
Professor of Chemistry

HERBERT EDGAR COBB, A. M.
Professor of Mathematics

FRED A. ROGERS, B. S.
Professor of Physics and Electrical Engineering

JESSIE LOUISE JONES, Ph. D.
Professor of German

GEORGE LEE TENNEY, A. M.
Professor of Latin

CHARLES EMERSON PEET, B. S.

Professor of Physiography

JOHN DEBK NIES, B. S.

Professor of Electrical Engineering

DUANE STUDLEY, B. S.

Assistant Professor of Mathematics

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Assistant Professor of English

BERKELEY JOHN THOMAS, A. M.

Assistant Professor of Mathematics

HELEN DOUGAL STREET, A. M.

Assistant Professor of Ancient History

DIC HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry

JESSE MYRON OWEN, Ph. B.

Assistant Professor of English

MILO MILTON QUAIFF, Ph. D.

Assistant Professor of History

WILLIAM PARKER HAWLEY, B. S.

Assistant Professor in charge of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.,

Assistant Professor of Mechanics

FRED LEWIS TURNER, A. M.

Assistant Professor of Latin

LEA RACHEL DELAGNEAU

Instructor in French

LOUIS EDWARD POPE

Instructor in Mathematics

MARIE ELSA BLANKE

Instructor in Freehand Drawing

GEORGE ALEXANDER ROSS

Instructor in Woodwork

CHARLES EDGAR HOYT

Instructor in Foundry Work

JULIA DUMKE PEET, Ph. B.

Instructor in German

EDWARD HERMAN LAY, A. B.

Instructor in Mathematics

KATE BELLE MILLER, Ph. B.

Instructor in English

***ETHEL PERCY ANDRUS, Ph. B.**

Instructor in English

**Resigned.*

OFFICERS OF INSTRUCTION.

9

KATHERINE ISABEL INGERSOLL

Instructor in charge of Domestic Arts

HORACE BERNARD MCCABE

Instructor in Machine Shop Work

EDWARD LESTER WHEELER

Instructor in Physical Culture

MINNA CAROLINE DENTON, A. M.

Instructor in Physiology and Bacteriology

MABEL THACHER WELLMAN, A. B.

Instructor in Charge of Domestic Science

ALPHONSO WIRTH CAVANAUGH

Instructor in Mathematics

ANNA ELIZABETH DRUMMOND, A. B.

Instructor in English

HELMUT BERENS, A. B.

Instructor in German

FREDERICK LESTER HAVENS

Instructor in Forge and Machine Shop Work

***ZOURA LANE CLARK, A. B.**

Instructor in English

EDNA NEWTON MCCALLUM, A. B.

Instructor in Latin

GEORGE FREDERICK CASSELL, A. B.

Instructor in German and Greek

GRACE EMERSON MOORE

Instructor in Cooking

VICTOR LOUIS SHERMAN

Instructor in Mechanical Drawing

JULIA GRACE MERRILL

Instructor in Cooking

JUDSON FISKE LEE, A. M.

Instructor in History and Economics

LOIS MARTIN

Instructor in Sewing

GRACE LUCILE HENNECKE

Instructor in Millinery

JOHN PAUL BAIRD

Instructor in Woodwork

**Resigned.*

ROBERT FREDERICK BIESEMEIER

Instructor in Machine Shop Work

GRACE GORDON HOOD

Instructor in Cooking

FRANK HARRISON WADE, M. E.

Instructor in Physics

JUDSON THOMAS WEBB

Instructor in Pottery

EDWIN D. LEMAN

Instructor in Chemistry

JACOB M. KINNEY, A. M.

Instructor in Mathematics

HELEN F. PAGE

Instructor in English

JOHN HENRY SMALE, A. B.

Instructor in English

ADOLPH C. FENSHOLT

Instructor in Physics

RHODA EDEY HARVEY

Assistant in Physical Culture

FRANCES TALCOTT

Librarian

ZELLA BISSELL

Stenographer

LAURA M. WINKLEMAN

Assistant in Millinery

PORTIA CARNES, Ph. B.

Assistant in English and Dramatics

CHARLES J. CLARK

Assistant in Foundry

CAROLINE WILKIE KOHLSAAT

Conductor of Orchestra

KATHARINE HOWARD WARD

Assistant in Music

ELIZABETH AGNES CADIGAN

Clerk and Telephone Attendant

General Information

Scope of Work

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in three main divisions, viz.: Engineering and Mechanic Arts; Domestic Economy; the Liberal Arts. The Institute grants the degree of Bachelor of Science in Mechanical Engineering, the title of Associate, and the Academy Certificate. The degree represents four years of college work, the title two years of college work, and the certificate four years of academy work.

Requirements for Admission

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

Applicants for admission other than those mentioned above will be examined on such subjects as are prerequisites for the studies which they wish to pursue.* In all cases the test will call for intelligence rather than for technical knowledge.

Assignment of Studies

On entering the Institute a student is assigned to such studies as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Courses of Instruction" and "Units"

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

A unit consists regularly of three academy courses (a year's work) in any given subject.

Bachelor of Science in Mechanical Engineering

To be enrolled as a candidate for the degree of Bachelor of Science in Mechanical Engineering, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 19-36:

Courses	Units.
English, 1-9	3
Mathematics, 1-6, 10-12	3
German, A-F	2
Science, or additional foreign language.....	2
History, 4-6	1
Physics, 1-3	1
Drawing, Mechanic Arts, 1, 5, 6.....	1
Shopwork, Mechanic Arts, 2, 3, 4, 7, 19, 20.....	2

*For example, applicants for entrance into the first year of academy work will be examined on English, arithmetic, history of the United States, and geography, as taught in the Chicago grammar schools.

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Bachelor of Science in Mechanical Engineering. The requirements are shown in detail in the curriculum (see next page).

The Title of Associate in Arts

To be enrolled as a candidate for the title of Associate the student must offer fifteen units of high school work, three of which shall be in English and two in Mathematics.

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

The Title of Associate in Domestic Economy

To obtain the Title of Associate in Domestic Economy the student must secure, in addition to fifteen admission units, credit for the prescribed work in Chemistry, Physiology, Bacteriology and Domestic Economy (eighteen courses), and one course in English Composition.

The Academy Certificate

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and opportunities.



**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM LEADING TO
DEGREE OF B. S. IN MECHANICAL ENGINEERING.***

FIRST YEAR.

AUTUMN QUARTER		WINTER QUARTER		SPRING QUARTER	
Course	Hours	Course	Hours	Course	Hours
English.....	1 5	English.....	2 5	English.....	2 5
Algebra..... A W	1 5	Algebra..... W S	2 5	Algebra..... A S	2 5
Machine Sketching E	1 10	Wood Shop..... E	2 10	Instrum'l Drawing E	5 10
Physiography.....	1 10	Physiography.....	2 10	Physiography.....	3 10

SECOND YEAR.

English.....	4 5	English.....	5 5	English.....	6 5
Plane Geometry A W	4 5	Plane Geometry.. W S	5 5	Plane Geometry.. A S	6 5
Projection Draw'g E	6 10	Forge Shop..... E	3 10	Foundry..... E	4 10
German.....	A 5	German.....	B 5	German.....	C 5

THIRD YEAR.

American History...	4 5	American History...	5 5	American History...	6 5
Physics.....	1 10	Physics.....	2 10	Physics.....	3 10
Machine Shop..... E	19 10	Machine Shop..... E	20 10	Pattern Shop..... E	7 10
German.....	D 5	German.....	E 5	German.....	F 5

FOURTH YEAR.

English..... A W	7 5	English..... W S	8 5	English.....	9 5
Algebra..... A W	10 5	Algebra..... W S	11 5	Solid Geometry.....	12 5
Pattern Shop.....	8 10	Machine Shop.. E	22 10	Machine Shop..... E	22 10
German..... G	5	German..... H	5	German..... I	5

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF B. S. IN MECHANICAL ENGINEERING.**

FIRST YEAR

English.....	A 5	English.....	B 5	English.....	C 5
Algebra..... A W	13 5	Trigonometry... W S	14 5	Analyt'l Geometry...	15 5
Chemistry.....	1 14	Chemistry.....	2 14	Chemistry.....	3 14
Machine Draw'g... E	10 10	Machine Sketching..	11 10	Surveying.....	13 10

SECOND YEAR.

Economics.....	10 5	Economics.....	11 5	Industrial History...	12 7
Calculus.....	16 5	Calculus.....	17 5	Calculus.....	18 5
Physics.....	4 15	Physics.....	5 15	Physics.....	6 15
Kinematics.....	28 7	Descriptive Geomet'y	25 7	Machines.....	15 7

THIRD YEAR.

Mechanics.....	16 5	Mechanics.....	17 5	Mechanics.....	18 7
Thermodynamics....	43 5	Machine Shop.....	23 10	Valve Gears.....	31 10
Electrical Laborat'y.	35 10	Electrical Laborat'y.	36 10	Electrical Laborat'y.	37 10
Machine Draw'g.. A S	12 10	Foundry.....	9 10	Mach. Tool Anal....	24 10

FOURTH YEAR.

Hydraulics.....	42 10	Direct Current Mach.	38 5	Induction, Motors, etc	39 5
Machine Design.....	32 10	Chemistry.....	12 15	Chemistry.....	13 15
Materials of Const...	46 10	Struct'l Steel Work...	33 10	Power Plants.....	49 10
		Specifications.....	50 2	Machine Design.....	27 5

* When a Course is given in more than one quarter, the quarter is indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring

SUGGESTED ACADEMY AND COLLEGE CURRICULUM LEADING TO TITLE OF ASSOCIATE IN ARTS.

FIRST YEAR.					
AUTUMN QUARTER		WINTER QUARTER.		SPRING QUARTER.	
	Course. Hours.		Course. Hours.		Course. Hours.
English	1 5	English.....	2 5	English.....	3 5
Algebra.....A W	1 5	Algebra.....W S	2 5	Algebra.....A S	3 5
Latin.....	1 5	Latin.....	2 5	Latin.....	3 5
Physiography.....	1 10	Physiography.....	2 10	Physiography.....	3 10

SECOND YEAR.					
English.....	4 5	English.....	5 5	English.....	6 5
Plane Geometry..A W	4 5	Plane Geometry..W S	5 5	Plane Geometry..A S	6 5
Latin.....	4 5	Latin.....	5 5	Latin.....	6 5
Ancient History.....	1 5	Ancient History.....	2 5	Ancient History.....	3 5

THIRD YEAR.					
American History....	4 5	American History....	5 5	American History....	6 5
Physics.....	1 10	Physics.....	2 10	Physics.....	3 10
Latin.....	7 5	Latin.....	8 5	Latin.....	9 5
German.....A	5 5	German.....B	5 5	German.....C	5 5

FOURTH YEAR.					
English.....	7 5	English.....	8 5	English.....	9 5
Algebra.....A W	10 5	Algebra.....W S	11 5	Solid Geometry.....	12 5
Latin.....	10 5	Latin.....	11 5	Latin.....	12 5
German.....D	5 5	German.....E	5 5	German.....F	5 5

FIFTH YEAR.					
English.....	10 5	English.....	11 5	English.....	12 5
European History....	7 5	European History....	8 5	European History....	9 5
Latin or.....	13 5	Latin or.....	14 5	Latin or.....	15 5
German or.....	4 5	German or.....	5 5	German or.....	6 5
French or.....	1 5	French or.....	2 5	French or.....	3 5
Greek.....	1 5	Greek.....	2 5	Greek.....	3 5

SIXTH YEAR.					
English.....	13 5	English.....	14 5	Philosophy.....	1 5
Economics or.....	10 5	Economics or.....	11 5	Industrial History or..	12 5
Latin or.....	16 5	Latin or.....	17 5	Latin or.....	18 5
German or.....	7 5	German or.....	8 5	German or.....	9 5
French or.....	4 5	French or.....	4 5	French or.....	5 5
Greek.....	4 5	Greek.....	5 5	Greek.....	6 5

TWO-YEAR COLLEGE CURRICULUM LEADING TO TITLE OF ASSOCIATE IN DOMESTIC ECONOMY

FIRST YEAR.					
Chemistry.....	D 10	Chemistry.....	E 10	Chemistry.....	F 10
Cooking.....A W	4 10	Cooking.....W S	5 10	Plant Physiology....E	1 10
Sewing and Design...	D 10	Sewing and Design...	E 10	Sewing and Drafting..F	10
English.....	10 5				
SECOND YEAR.					
Physiology.....A W	2 10	Bacteriology A W	3 10	Sanitation.....	10 5
Food and Dietetics...	7 10	Food and Dietetics...	8 10	Economics of Home..	9 5
Millinery and Sewing	G 10	Millinery & Laundry..H	10	Sewing and Textiles..I	10
				Cooking.....	6 10

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Instructor in Machine Shop Work

GRACE GORDON HOOD

Instructor in Cooking

FRANK HARRISON WADE, M. E.

Instructor in Physics

JUDSON THOMAS WEBB

Instructor in Pottery

EDWIN D. LEMAN

Instructor in Chemistry

JACOB M. KINNEY, A. M.

Instructor in Mathematics

HELEN F. PAGE

Instructor in English

JOHN HENRY SMALE, A. B.

Instructor in English

ADOLPH C. FENSHOLT

Instructor in Physics

RHODA EDEY HARVEY

Assistant in Physical Culture

FRANCES TALCOTT

Librarian

ZELLA BISSELL

Stenographer

LAURA M. WINKLEMAN

Assistant in Millinery

PORTIA CARNES, Ph. B.

Assistant in English and Dramatics

CHARLES J. CLARK

Assistant in Foundry

CAROLINE WILKIE KOHLSAAT

Conductor of Orchestra

KATHARINE HOWARD WARD

Assistant in Music

ELIZABETH AGNES CADIGAN

Clerk and Telephone Attendant

General Information

Scope of Work

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in three main divisions, viz.: Engineering and Mechanic Arts; Domestic Economy; the Liberal Arts. The Institute grants the degree of Bachelor of Science in Mechanical Engineering, the title of Associate, and the Academy Certificate. The degree represents four years of college work, the title two years of college work, and the certificate four years of academy work.

Requirements for Admission

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

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**THE ORIGIN AND HISTORY OF COMMON LAND FORMS. By
Wallace Walter Atwood, Ph.D., Assistant Professor of
Physiography and General Geology.**

February 17.—The Fantastic Features of the Landscape: A Study of the Processes of Weathering and Soil-making.

February 24.—River Valleys: A Study of the Work of Running Water, Including Gullies, Ravines, Glens, Dales, Gorges, and Canyons.

March 3.—River Valleys, *continued*. The Growth of Valleys through Youth to Maturity and Finally to Old Age. The Final Reduction of a Country to Approximately Sea Level.

March 10.—Shoreline Features: A Study of the Work of Waves and Shore Currents.

March 17.—Land Forms Due to the Ancient Ice Sheets of North America: A Study of the Glacial Period.

March 24.—Volcanoes.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

1c. **CO-OPERATIVE COURSE.** The principles of arithmetic, algebra, geometry, and trigonometry required in shop practice. Problems in electricity, sound, light, heat, and mechanics based on the work in the physics laboratory. Three quarters.

2c. **CO-OPERATIVE COURSE.** Accounting and practice in writing business papers; two quarters. Applied mathematics; one quarter.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA.** Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. **ADVANCED ALGEBRA.** Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. **SOLID GEOMETRY.** Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. **ALGEBRA.** Permutations and combinations, limits, convergence of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

16. **CALCULUS.** Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS.** Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS.** Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

LEWIS INSTITUTE BULLETIN



CHICAGO, OCTOBER, 1910

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6. **COOKING.** Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: *Courses 7 and 8.*

7. **FOOD AND DIETETICS.** A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry D-F.*

8. **FOOD AND DIETETICS.** A continuation of 7. Diet and dietaries. The detection of adulteration and preservatives in food.

9. **ECONOMICS OF THE HOUSEHOLD.** The cost of living and the apportionment of the income. A study of rent, fuel, light, and the like, with reference to cost and efficiency. Family budgets and their value. Methods of keeping household accounts. A special consideration of woman's changing economic position and the effect upon the family.

10. **SANITATION, HOUSEHOLD AND PUBLIC.** The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common and transmissible diseases. Lectures and reference work, field excursions. Prerequisite: *Bacteriology 3.*

History and Economics

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

A year is also given to economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. **ANCIENT HISTORY.** The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. **ANCIENT HISTORY.** The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. **ANCIENT HISTORY.** The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. **AMERICAN HISTORY.** The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, the history of the English colonies, the Revolution and the separation from the mother country, the institution of confederate government and its failure.

5. **AMERICAN HISTORY.** The creation of the Constitution and the organization of the new national government, the development and meaning of national political parties, the foreign relations leading to the War of 1812, the further political and industrial growth of the nation, the rise of sectionalism due to the development of divergent systems of labor and industry in North and South, the culmination of the sectional contest, the Civil War.

6. **AMERICAN HISTORY.** The results of the Civil War, the work of national reconstruction, the final conquest of the West, the rise of the new industrial order, the political and social problems resulting from it, the Spanish War and the abandonment of the policy of national exclusiveness, America as a world power.

7. **MEDIAEVAL EUROPE.** An outline course in general European history covering the period from the reorganization of the Roman Empire under Diocletian to the close of the fifteenth century, treating in such detail as the time will permit the civilization and institutions peculiar to the period.

8. **MODERN EUROPE.** From the beginning of the sixteenth century to the present time. This course is planned to articulate with course 12 and therefore proportionately less time will be devoted to the period after than to that before 1815.

9. **ENGLISH HISTORY.** An outline course in English history from the earliest times to the present day. Such emphasis as the scope of the course permits will be placed upon the modern period and the career of imperial England.

10. **ECONOMICS.** The Consumption, Production, and Distribution of Wealth.

11. **ECONOMICS.** Money, Credit, and Banking; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform.

12. **ECONOMIC HISTORY SINCE 1760,** with special reference to the development of industry and commerce in the United States.

Philosophy

1. **INTRODUCTION TO PHILOSOPHY.** The meaning of the word "philosophy" as used in academic circles to-day; the nature of reflective thought as compared with ordinary thought, scientific thought, and poetic thought; the chief philosophical problems; the chief types of philosophic doctrine. [The course is open to sophomores and juniors. A certain amount of reading in psychology is presupposed and required. Students who intend to elect the course in the spring are requested to consult with the Dean of College Students at the opening of the year in order to arrange for this reading.]

English

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on pages 12 and 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is de-

signed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, First Manual of Composition, revised edition; Lewis, Introduction to the Study of Literature; Moulton, Old Testament Stories; Shakspeare, The Merchant of Venice, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the Riverside Literature Series, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's Life of Lincoln. These books are referred to below by abbreviations.

1. Average sections cover First Manual, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover First Manual, II., and Introduction, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover First Manual, III., and Introduction, VI.-X. Special sections abbreviate Introduction.

4. Average sections cover First Manual, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover First Manual, V., Schurz's Lincoln (133), and Warner (37). Special sections omit 37.

6. Average sections cover First Manual, VI., and The Merchant of Venice.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with the American Colonies; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

8. COMPOSITION. The work is based on Lewis's Second Manual of Composition.

9. Shakspeare's As You Like It, and Julius Caesar; Bunyan's The Pilgrim's Progress, Part I; Goldsmith's The Deserted Village; Dickens's A Tale of Two Cities; George Eliot's Silas Marner; Irving's The Sketch Book; Ruskin's Sesame and Lilies; Arnold's Sohrab and Rustum; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur.

10. ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

11. ENGLISH LITERATURE. The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the

nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. **SHAKSPEARE.** Dowden's Shakspeare Primer, Hudson's School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest.

13. **ENGLISH COMPOSITION.** Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. **THE ENGLISH ESSAY.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

A, B, C. **ENGLISH FOR ENGINEERS.** The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-9 cover a period of three years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises

and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. ELEMENTARY GERMAN. Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs.

C. ELEMENTARY GERMAN. Grammar continued. Verb forms emphasized. Easy prose reading.

D. READINGS IN EASY NARRATIVE PROSE. Continued drill on grammatical forms. Prose composition based on texts read.

E. NARRATIVE PROSE AND ONE EASY COMEDY. Reproductive translation into German. Conversational exercises.

F. MODERN PROSE READINGS. Reproductive translation and independent themes.

G. SCHWEITZER-SIMONNOT's *Deutsches Lesebuch für Quarta und Tertia*.

H. GERMAN PROSE COMPOSITION. Pope's text-book.

I. A MODERN NOVEL.

1, 2, 3. ELEMENTARY GERMAN FOR COLLEGE STUDENTS. *Thomas's Grammar*, Part 1. *Leander's Traumerelen*. *Schweitzer-Simonnot's Lesebuch*.

4. HISTORICAL PROSE. An essay, a novel, and a drama.

5. PROSE COMPOSITION AND THEMES.

6. MODERN NOVELS. *Ebner-Eschenbach*, *Freytag*, *Sudermann*.

7, 8. *Schiller's Life and Works*.

9. THE MODERN DRAMA. *Kleist*, *Grillparzer*, *Hebbel*, *Hauptmann*, *Sudermann*, *Fulda*.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. **ELEMENTARY FRENCH.** Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, François.

2. **ELEMENTARY FRENCH.** Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: Fraser and Squair for reference. Reading: François and Giroud's *Simple French*. Sans Famille (Malot), *Le Petit Chose* (Daudet).

3. **MODERN SHORT STORIES.** Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Erckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), Muller's *Grandes Découvertes Modernes*. Prose and conversation based on texts read.

4. **MODERN FRENCH COMEDIES.** Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Tresor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le Voyage de Monsieur Perrichon* (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt treize*, *Hernani*, *La Chute*, and other works of that period. Prose; frequent reproductive exercises; letters, business and friendly, twice a week.

6. **MOLIÈRE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Précieuses Ridicules*. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* Polyeucte (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the

people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. **ELEMENTARY LATIN.**

3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulae Faciles*.

4. **SELECTED FABLES AND STORIES** from Roman history.

5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**

7, 8. **CICERO, ORATIONS AGAINST CATILINE.** A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. **CICERO, PRO ARCHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in Courses 7 and 8.

10. **VIRGIL, AENEID, I, II.** Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.

11. **VIRGIL, AENEID, III., IV.**

12. **VIRGIL, AENEID, V., VI.** General review. Latin writing.

13. **LIVY.** Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.

14. **HORACE.** Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.

15. **LATIN COMEDY.** Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.

16. **PLINY'S LETTERS**, supplemented by reading of Juvenal's satires and Martial's epigrams.

17. **TACITUS.** *Agricola*, *Germania*, and selections from the *Annales*.

18. **CICERO.** *De Amicitia* or *De Senectute*. **LUCRETIUS,** *De Rerum Natura*.

Greek

1. **ELEMENTARY GREEK.** The essentials of the grammar, with illustrative sentences in Greek and English. Selections from the *Anabasis*.

2. **XENOPHON, ANABASIS, Book I.** Composition; grammar. The modification of verbal stems, euphonic changes, and drill in principal parts of irregular verbs.

3. **XENOPHON, ANABASIS, Books II., III., IV.** Greek writing; grammar.

4. **HOMER, ILIAD, Books I., II., III.;** selections from IV.-XXIV.

5. **HOMER, ODYSSEY;** selections from Books I.-XIII.

6. **PLATO, APOLOGY AND CRITO. XENOPHON, MEMORABILIA.** Greek writing.

Decorative Art

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the handling of materials in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stencilling will be given as demand rises.

1. **FREE-HAND DRAWING.** Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, all-over designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Evening Session of 1910-1911

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION

GEORGE NOBLE CARMAN, A. M.
Director.

PHILIP BELL WOODWORTH, B. S., M. E.
Dean of Evening School

EUGENE C. HALL
Registrar of Evening School

OFFICERS OF INSTRUCTION

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics and Electrical Engineering

ALEXANDER WILLETT MOSELEY, S. B.
Professor of Mechanical Engineering

HERBERT EDGAR COBB, A. M.
Professor of Mathematics

FRED A. ROGERS, B. S.
Professor of Electrical Engineering

JOHN DERK NIES, B. S.
Professor of Electrical Engineering

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry

WILLIAM PARKER HAWLEY, B. S.
Assistant Professor in charge of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.
Assistant Professor of Mechanics

GEORGE ALEXANDER ROSS
Instructor in Woodwork

KATHERINE ISABEL INGERSOLL
Instructor in charge of Sewing and Millinery

HORACE BERNARD MCCABE
Instructor in Machine Shop Work

FREDERICK LESTER HAVENS, M. E.
Instructor in Machine Shop Work

ROBERT FREDERICK BIESEMEIER
Instructor in Machine Shop Work

JUDSON THOMAS WEBB
Instructor in Pottery

GORDEN CROWELL ABBOTT
Instructor in Machinery Drawing

BRYANT WHITE, A. B., S. B.
Instructor in Machinery Drawing

ALBERT SIDNEY MERRILL, S. B.
Instructor in Steam Laboratory

NICHOLAAS PRAKKEN
Instructor in Architectural Drawing

JOHN HENRY SMALE, A. B.
Instructor in charge of English and Commercial Subjects

OFFICERS OF INSTRUCTION.

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JOSEPH PHIPPIN SHAW

Instructor in Accounting

EDWIN D. LEMAN

Instructor in Chemistry

MARY KANE

Instructor in Physical Culture

CHARLES I. CARPENTER

CHARLES B. KAZDA

CHARLES R. KOLKOW, S. B.

ARTHUR E. VAN HAGAN, B. S.

FRANK H. WADE, M. E.

Instructors in Mathematics.

SAMUEL E. BIRD

GRANT D. BRADSHAW, B. S.

MAX A. GIFFEY

BERNARD RIFFEL, M. E.

VICTOR L. SHERMAN

Instructors in Mechanical Drawing

GRACE LUCILE HENNECKE

GRACE GORDON HOOD

GERTRUDE AYER HUBBARD

MARY F. JUHNKE

LOIS MARTIN

FLORENCE F. NOETON

ETHEL J. POND

MILDRED E. STAVERS

JENNIE D. WYSE

Instructors in Domestic Economy

BEATRICE M. BRICKWOOD, A. B.

ADA E. CAMPBELL

CORA J. KOHLSAAT

HARRIET M. ROBERTSON

MARY E. SULLIVAN

Instructors in English

WALTER E. BAUERLE

MAURICE L. CARR, B. S.

ADOLPH H. FENSHOLT

HARRY N. GILBERT, M. E.

ARTHUR H. HAEVEY

WILL ORLANDO JACOBI, M. E.

RALPH H. KILNER, M. E.

JOHN D. MCGRATH

AUGUSTUS W. SHARP

OREN G. SHERMAN

ELMER S. SMAIL

RICHARD H. R. WHITEHEAD, M. E.

Laboratory Assistants

General Information

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, bookkeepers, firemen, nurses, stenographers and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Director and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for a week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 6 to 10 o'clock Monday, Tuesday, Wednesday and Thursday evenings from October 3 to May 18.

The Library is open from 6 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

For the convenience of teachers in the public schools certain courses in Mechanic Arts and in Domestic Economy are given from 4 to 6 in the afternoon and on Saturday mornings.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses.

MECHANIC ARTS.

3, 4—Mechanical Drawing, 3 terms—	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
2, 5—Architect'al Drawing, 3 " "	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
6, 8—Wood & Found. Work, 3 " "	Saturday morning, 8:30-12:30.
10-12—Machine Shop Work, 3 " "	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
10-12—Machine and Forge, 3 " "	Saturday morning, 8:30-12:30.

ENGINEERING.

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. & W., 6-8 or 7-9 or 8-10
4. Electrical Laboratory, Electrical Instruments. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4a Steam Laboratory, Heat and Work. Tu. and Th., 7.30-9.30.	5a Steam Laboratory, Steam Engine. Tu. and Th., 7.30-9.30.	6a Testing Laboratory, Gas Engine Practice. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. 10 Tu. and Th., 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. 11 Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. 12 Tu. and Th., 7.30-9.30.
13 Structural Steel Work. Tu. and Th., 7.30-9.30.	14 Structural Design. Tu. and Th., 7.30-9.30.	15 Concrete Construction. Tu. and Th., 7.30-9.30.

MATHEMATICS.

1, 2—Arith. and Accounting, 3 terms, Tu. and Th., 7:30-9:30.	
3—Elementary Algebra, 3 " "	Mon. and Wed., 7:30-9:30; Tu. and Th., 7:30-9:30.
5-7—Algeb. and Trigonomy, 3 " "	Tu. and Th., 7-9.
4—Geometry, 3 " "	Tu. and Th., 7-9 and 8-10.
8—Engineering Mathematics, First year—Autumn and Winter, Mon. and Wed., 7-8; Spring, Tues., 7-9.	
9—Engineering Mathematics, 3 terms—Second year, Th., 7:30; Third year, Mon., 7:30.	

CHEMISTRY.

1. Practical Chemistry, 3 terms—	Tu. and Th., 7:30-9:30
2 and 3. Qualitative and Quantitative Analysis, 3 " "	Tu. and Th., 7:30-9:30

DOMESTIC ECONOMY.

1—Cooking, 3 terms	Mon. and Wed., 4-6 and 7-9; Tu. and Th., 4-6 and 7-9.
2—Sewing, 3 " "	Saturday morning, 8-12.
	Tu. and Th., 4-6 and 7-9; Sat. morning, 8-12.

ENGLISH, GERMAN, AND LATIN.

1—Elementary English, 3 terms, Tu. and Th., 7:30-9:30.	
2—Intermediate English, 3 " "	Mon. and Wed., 7:30-9:30
3—Advanced English, 3 " "	Mon. and Wed., 7:30-9:30
—German, 1 " "	Tu. and Th., 7:30-9:30.
—Latin, 3 " "	Mon. and Wed., 7:30-9:30.

POTTERY AND PHYSICAL CULTURE.

Pottery, 8 terms, Tu. and Th., 4-6 and 7-9; Sat., 9-12	
Physical Culture for Women, 3 " "	Mon. and Wed., 8-10.

UNIVERSITY EXTENSION LECTURES.

Four Courses of Six Lectures each Thursday evenings, September 29 to March

Description of Evening Courses

Mechanic Arts

1. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.
2. **ELEMENTARY ARCHITECTURAL DRAWING.** For beginners. Lettering and instrumental practice. Arrangement of posts, girders, joists, and partitions. Various roofs for a given floor plan. Designing from sketches, arrangement of rooms, rise and run of stairs. Materials of construction. Design of flats and blocks, plumbing, heating, specifications, and bills of material.
3. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 2 by more practice in machine details.
4. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 2 and 3 and experienced draftsmen.
5. **ROOF AND STAIR DRAWING.** For carpenters, joiners, and carpenter's apprentices. Work in roof framing with methods for obtaining lengths and cuts of the different rafters in a complicated roof. Design and laying out of straight, winding, and circular stairs; also eases, ramps, and goose necks for different types of architecture.
6. **ELEMENTARY WOODWORK.** For beginners and teachers preparing to teach Manual Training. Care and uses of tools. Talks on woods and their characteristics. Construction of models.
- 6a. **CARPENTRY AND JOINERY.** Designing and laying out parts of buildings. Computing the cost of material and labor. Practice in the construction of models.
- 6b. **CABINET WORK.** Designing interior finish and furniture for buildings. Practice in the construction and finishing of furniture.
7. **PATTERN MAKING.** Elementary and advanced. Machinery and architectural pattern-work.
8. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.
9. **MACHINE TOOL WORK.** Description of the construction and operation of engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.
10. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.
11. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.
12. **TOOL AND DIE MAKING.** Practice with the lathe, planer, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making, punching, bending, and forming dies and adjusting in punch press.

Engineering

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms. Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to use in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY.** Electrical Instrument Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY.** Direct Current Generators and Motors. Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY.** Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector. Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

5a. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

6a. **GAS ENGINE PRACTICE.** Combustion of fuels. Internal com-

bustion engines. Four-cycle engine; two-cycle engine. Details of construction of pistons, governors, valves, and throttle-regulators.

7. **ALTERNATING CURRENTS.** Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. **ALTERNATING CURRENTS.** Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reactances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10, 11, 12. Continuation of 7, 8, 9, respectively.

13. **STRUCTURAL STEEL.** Composition and Equilibrium of Forces, parallel forces and center of gravity; Statics of simple structures. Strength of Materials; Tension, compression, sheer, and flexure; Ties, columns, beams, rivets, and pins.

14. **STRUCTURAL DESIGN.** Joints, simple roof truss, plate girder, study of simple bridge, specifications. Truss bridges, dead load, live load, impact and wind stresses, computation of sections.

15. **CONCRETE CONSTRUCTION.** Lecture, laboratory, and drafting room work. Composition and properties. Construction and tests of reinforced columns and beams. Specifications and unit strains. Floor construction and design.

Mathematics

1. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

2. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. **PLANE GEOMETRY,** including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY,** including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permuta-

tions and combinations, and the use of four and five place tables of logarithms.

6. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

7. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

8. **ENGINEERING MATHEMATICS.** Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power.

9. **ENGINEERING MATHEMATICS.** Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

10. **ENGINEERING MATHEMATICS.** Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry

1. **PRACTICAL CHEMISTRY.** The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

2. **QUALITATIVE ANALYSIS.** The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

3. **QUANTITATIVE ANALYSIS.** As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may

begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy

1. **COOKERY.** Practical work in the preparation of food, with the study of the food elements and the effect of heat upon each. Invalid cookery.

2. **SEWING AND MILLINERY.** Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English

1. **ELEMENTARY ENGLISH:** Composition and word study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. **INTERMEDIATE ENGLISH.** Composition and advanced grammar; rhetoric and the study of English masterpieces. Chief object, to train the student in the use of accurate and idiomatic English. Much attention is given to sentence and paragraph structure, punctuation, and spelling. Two or more themes each week are required.

3. **ADVANCED ENGLISH.** Composition, advanced rhetoric, and English literature. Object, to teach the principles of effectiveness in the use of the language, the application of these principles in theme writing, and a sound appreciation of the best English literature.

THE ENGLISH ESSAY. A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course.

Latin and German

The courses in Latin and German are designed to meet the needs not only of beginners but also of those who wish to do more advanced work.

Summer Session—1910

July 5 to August 12

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION

GEORGE NOBLE CARMAN, A. M.
Director

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Registrar

OFFICERS OF INSTRUCTION

FRED A. ROGERS, B. S.
Professor of Physics

DUANE STUDLEY, B. S.
Assistant Professor of Mathematics

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Assistant Professor of English

BERKELEY JOHN THOMAS, A. M.
Assistant Professor of Mathematics

DIO HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry

WILLIAM PARKER HAWLEY, B. S.
Assistant Professor of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.
Assistant Professor in Mechanics

FRED LEWIS TURNER, A. M.
Assistant Professor of Latin

GEORGE ALEXANDER ROSS
Instructor in Woodwork

CHARLES EDGAR HOYT
Instructor in Foundry Work

KATHERINE ISABELL INGERSOLL
Instructor in charge of Sewing and Millinery

ALPHONSO WIRTH CAVANAUGH
Instructor in Mathematics

HELMUT BERENS, A. B.
Instructor in German

GEORGE FREDERICK CASSELL, A. B.
Instructor in German

JULIA GRACE MERRILL
Instructor in Cooking

JUDSON FISKE LEE, A. M.

Instructor in History

GRACE LUCILE HENNECKE

Instructor in Millinery

JUDSON THOMAS WEBB

Instructor in Pottery

ROBERT J. KERNER, Ph. B.

Instructor in History

EDWIN D. LEMAN

Instructor in Chemistry

PAULINE GLEASON

Instructor in French

JOHN HENRY SMALE, A. B.

M. ELIZABETH SNEED

HARRIET L. ROBERTSON

ROSAMOND M. TOWER

JESSIE M. HOYT

HELEN PIERCE

Instructors in Grade Work

LEE FRANCIS SUPPLE

Assistant in Chemistry

JOHN D. McGRATH

Assistant in Physics

JEAN BLISS

Assistant in Sewing

General Information

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.
2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.
3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, covering the work of each year of the high school in English, mathematics, history and foreign languages.

4. For pupils of the sixth, seventh and eighth grades of the public school, classes are formed to do the regular work of these grades.

The tuition for the summer term for a course in one subject five hours a week of class instruction, is five dollars. In Laboratory, drawing, shop work and grade work, ten hours, or a fraction thereof, count as five in determining the tuition.

Mechanic Arts

MANUAL TRAINING. Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. **CABINET MAKING.** A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

7. **ELEMENTARY PATTERN MAKING.** Intended for students in Engineering and teachers of Manual Training.

8. **ADVANCED PATTERN MAKING.** Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

4. **FOUNDRY WORK.** The instruction in foundry work is largely individual, the complete equipment of the shop making it possible to give such work as each student desires and needs. One may specialize in cupola and furnace work, in core making, in art bronze and brass work, or in light or heavy machinery molding. Special attention will be given to a course for teachers of manual training.

5. **INSTRUMENTAL DRAWING.** A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. **PROJECTION DRAWING.** Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. **MACHINE DRAWING.** Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing.

More advanced machine design will be taught if desired.

20. **MACHINE SHOP PRACTICE.** A course embodying a study of the construction of the different machine tools with instruction in operating and keeping them in order. Practice in centering, plain, taper, and templet turning, chucking, drilling, boring, external and internal thread cutting; hand tool turning, filing and polishing. Forms of cutting tools, and instruction in grinding. Use of planer, shaper, and universal miller, and grinder; plain milling and cutting of spur and bevel gears.

Mathematics

1a. **ARITHMETIC.** An elementary course in preparation for admission to the Institute.

1. **ELEMENTARY ALGEBRA.** Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. **ELEMENTARY ALGEBRA,** four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. **CONCRETE GEOMETRY,** one day a week.

3. **ELEMENTARY ALGEBRA,** four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. **CONCRETE GEOMETRY,** one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar polygons.

6. **PLANE GEOMETRY,** completed.

10. **ADVANCED ALGEBRA.** A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. **SOLID GEOMETRY.** Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. **COLLEGE ALGEBRA.** Permutations and combinations, limits, convergence of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

Physics and Engineering

A. **GENERAL PHYSICS.** An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

4. **ADVANCED PHYSICS.** An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

5. **ELECTRICAL LABORATORY.** The courses in this department will be arranged to suit the individual student.

Chemistry

All courses are designed to meet, as far as possible, the wants of each student.

A. **GENERAL CHEMISTRY.** Academy course.

1. **GENERAL CHEMISTRY.** College course.

4. **QUALITATIVE ANALYSIS.**

6. **QUANTITATIVE ANALYSIS.** Analysis of foods, etc.

7. **ORGANIC CHEMISTRY.** General laboratory work.

Domestic Economy

COOKING. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A. **SEWING.** Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

B. **SEWING.** Cutting and making of shirtwaists and wash dresses. Four hours a day.

History

1a. **UNITED STATES HISTORY.** An elementary course in preparation for admission to the Institute.

1. **GREEK HISTORY,** from the Persian wars to the death of Philip of Macedon.

2. **ROMAN HISTORY,** from the Punic wars to the death of Cæsar.

3. **ENGLISH HISTORY,** from the Norman conquest to the present time.

4. **UNITED STATES HISTORY.** An advanced course with special at-

tention to the sources and formation of the Constitution, its operation, and the history of political parties.

5. The History of Europe since 1815, based upon Robinson and Beard's Development of Modern Europe, Vol. II.

English

A. READING, GRAMMAR, AND COMPOSITION. A course in elementary English in preparation for admission to the Institute.

1. LITERATURE AND COMPOSITION. A review of the required English of the first year.

4. LITERATURE AND COMPOSITION. A review of the required English of the second year.

7. LITERATURE. The "study-books" required for college entrance in 1909.

9. LITERATURE. The "reading-books" required for college entrance in 1910.

German, Latin, and French

Such elementary classes as may be necessary to meet the demands of the students in attendance.

Pottery

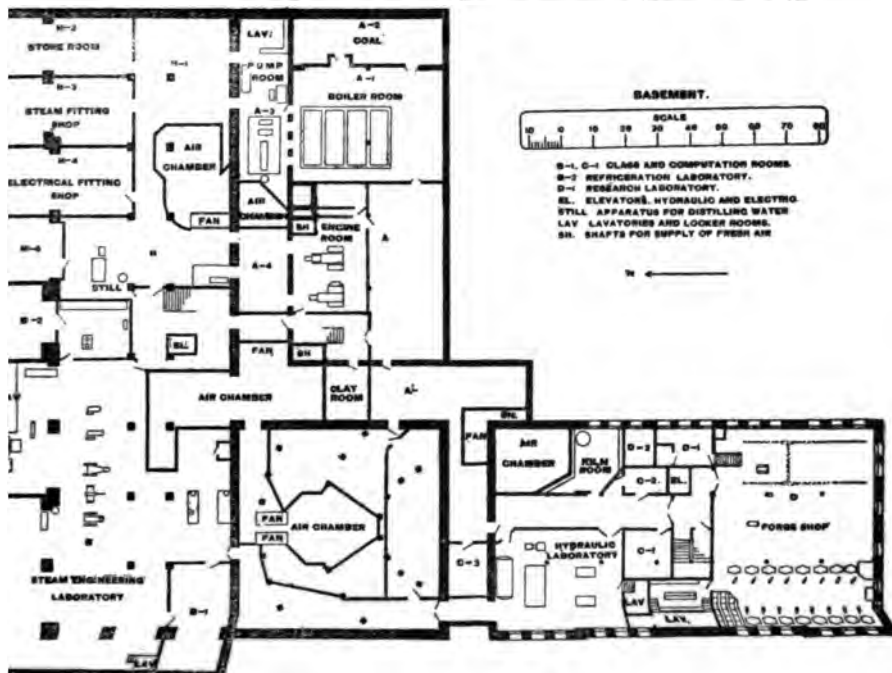
The production of artistic pottery. The instruction will be adapted to the needs of teachers.

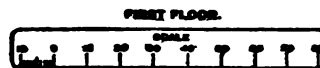
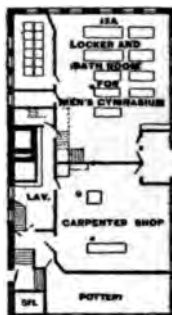
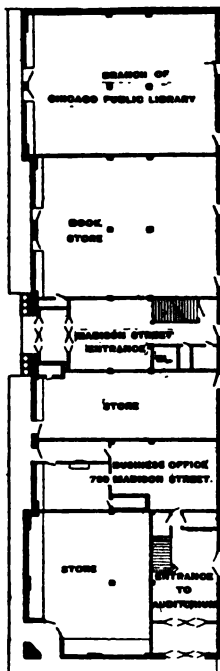
Buildings and Plans

The buildings are fire-proof structures of brick, sandstone, terra-cotta, and steel, and have been erected at a cost of four hundred thousand dollars for buildings, and one hundred and fifty thousand dollars for equipment.

The Arts Building, at the corner of Madison and Robey streets, is a six-story structure; the Engineering Building, on Robey street, has seven stories, and the Gymnasium, in the rear of the other buildings, has two stories. A high, well-lighted basement occupies the entire space covered by all the buildings and the alleys which separate them.

Both the Engineering and the Arts Buildings are supplied with elevators and the most approved appliances for heating and ventilation, and are equipped with all apparatus needed for the successful accomplishment of the work that has been undertaken.

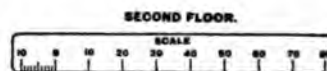
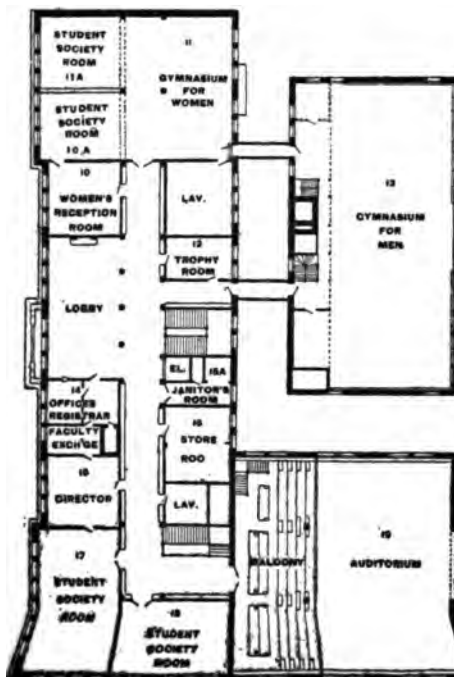
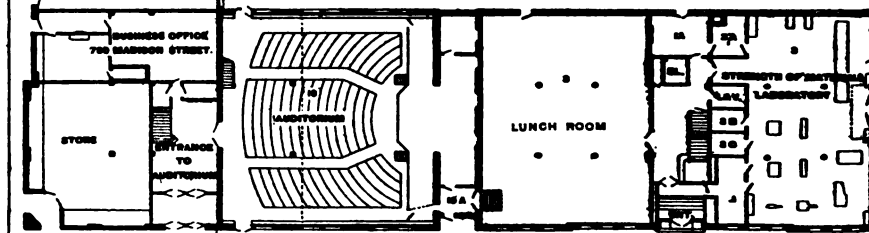




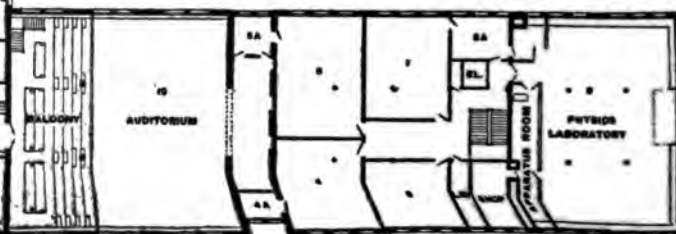
1 OFFICE OF DEPARTMENT OF ENGINEERING.
10A STAGE ENTRANCE TO AUDITORIUM.
ENT. ENTRANCE TO BUSINESS BUILDING.
LAV. LAVATORIES AND LOCKER ROOMS.

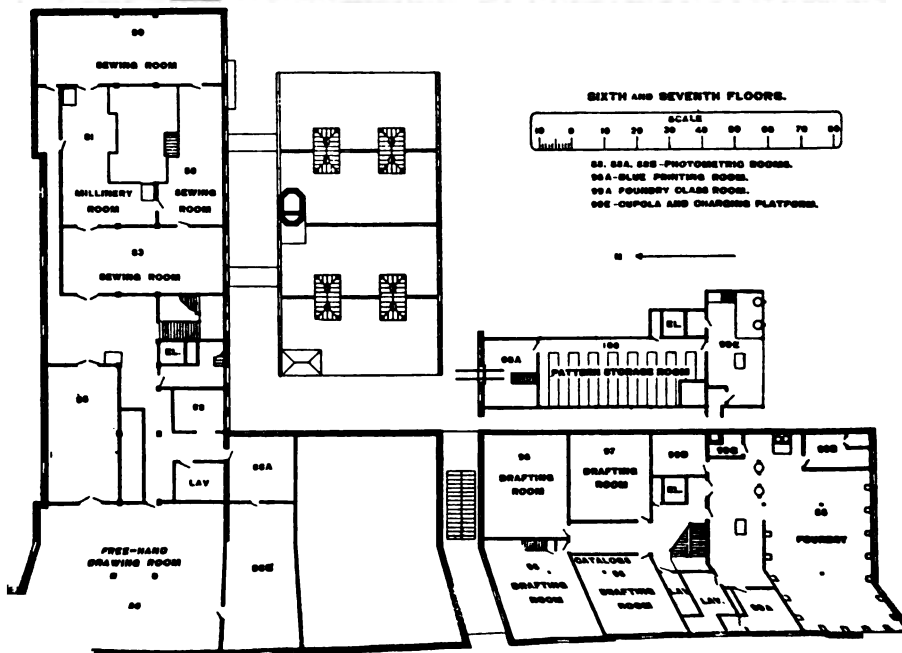
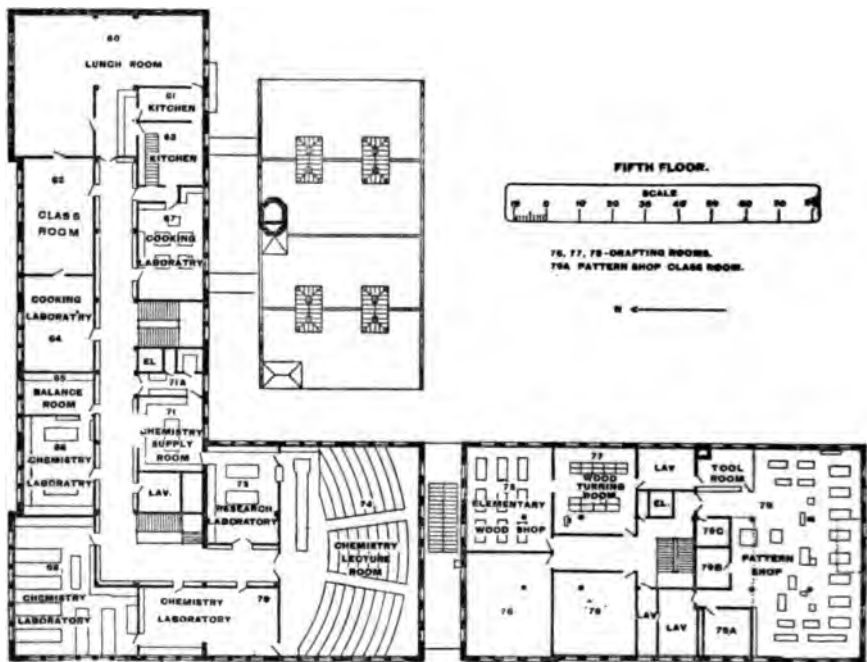


PRIVATE ALLEY.



4, 5 CLASS ROOMS IN ENGINEERING.
5, 5A ENGLISH CLASS ROOM AND OFFICE.
7, 8A CLASS ROOM AND OFFICE IN GEN'L PHYSICS





Laboratories

The *Dynamo Laboratory* is on the third floor of the engineering building. The equipment includes one 33-kilowatt direct current motor; sixteen direct current motors in sizes up to 5 horse-power; one 35-light arc dynamo; one 30-kilowatt three-phase alternator; one 5-kilowatt two-phase alternator; one 7.5-kilowatt, one 6-kilowatt, and three 5-kilowatt rotary converters, provided with switchboards so arranged that the machines can be operated as plain alternating current or direct current generators or motors, or as converters; two 2-horse-power single-phase induction motors; one 3-horse-power and two 1-horse-power three-phase squirrel-cage motors; one 5-horse-power three-phase variable speed induction motor mounted on a cradle dynamometer, and available as an induction motor, generator, or regulator, as a three-phase transformer, and as a frequency changer; one 1-horse-power variable speed three-phase induction motor; four 2.5 kilowatt transformers with connections for two-phase three-phase transformation; six 5-kilowatt transformers with a wide range of voltages; one 30,000-volt testing transformer; one constant current series arc transformer with lamps; one constant current arc regulator; a large number of indicating instruments, potential and current transformers, artificial transmission lines, motor compensators, resistances, reactances, condensers, etc.

The *Mechanical and Strength of Materials Laboratory* occupies one-half of the first floor of the engineering building. This laboratory is arranged for work of various kinds. In the equipment are a Reeves variable speed counter-shaft, a Thurston oil tester, a 6-horse-power gas engine, an Ericsson hot air engine, and gauges, indicators, and other instruments employed in operation and test. Here also are the following testing machines: A 200,000-pound Olsen, a 40,000-pound Riehle, a 1½-inch by 4-foot Olsen torsion, a Keep dead load, a Keep impact for cast iron, and a 2,000-pound Fairbanks for cement. The equipment for *Surveying* is kept in this Laboratory. A bank of steel wire lock-

ers contains transits, levels, sextants, compasses, barometers, and other field equipment sufficient for ten parties in surveying.

The *Hydraulic Laboratory* is situated in the north end of the basement of the engineering building. It is equipped with weighing, pressure, and weir tanks, rotary and reciprocating pumps, Pelton wheel, hydraulic ram, and the necessary instruments and tools.

The *Steam Laboratory* is situated in the basement of the arts building. It is arranged for work in compressed air, ammonia, and steam. Included in its equipment are a 30-horse-power return flue boiler, arranged for natural or induced draft; an 8 by 20-inch Harris Corliss engine; a 10-kilowatt Kerr steam turbine generator unit; a 7 by 12 inch Straight Line engine and two smaller experimental engines; a surface condenser; an air and ammonia compressor in connection with a half-ton refrigerating system; two large air tanks capable of withstanding 1,200 pounds pressure per square inch; several makes of steam injectors; water measuring tanks, scales, brakes, indicators, calorimeters, gauges, and other instruments employed in making tests on engines and boilers. For standardizing pressure gauges and indicator springs there is a 50-foot mercury column.

The *Department of Physics* has two especially equipped lecture rooms with stereopticons, hydraulic lifts, pressure gauges, vacuum gauges, illuminated-dial electrical instruments, and recording hygrometer and thermometer. The lecture tables are provided with water, gas, compressed air, steam, vacuum pumps, and electricity.

The rooms for the use of the department are: General physics laboratory, apparatus and preparation rooms, photometric rooms, private workroom, advanced laboratory, and electrical measurements room. In the advanced physics laboratory each table is provided with slate-lined fuse boxes, from which different currents for use in testing may be obtained. The reference library is supplied with a large assortment of books on the subjects of Physics and Electricity. The photometric room is equipped with Lummer-Brodhun and Flicker photometers, and standard lamps.

The workroom is in charge of a competent mechanic, and is equipped with a drill press, an eight-inch Rivett precision lathe

with attachments for milling, grinding, and screw-cutting, a Walker grinder, and numerous hand tools.

The laboratories are fully equipped with apparatus for quantitative work in general physics and electricity. Some of the more recent additions to the outfit for work in light are the following: A Schmidt and Haensch spectrometer, a Schmidt and Haensch polariscope, a Michelson interferometer, and a Newton lecture-room polariscope.

The electrical equipment consists of standards of resistance, capacity, self-induction, and electromotive force; resistance boxes, bridges, galvanometers, and electrometers from Nalder Brothers & Co., Elliott Brothers, and Hartmann & Braun; also dynamometers, voltmeters, and ammeters of various types and ranges. A twelve-inch induction coil furnishes an important part of the equipment. Specially designed switchboards are placed in the general physics laboratory and in the advanced laboratory.

The working equipment used for calibration and tests consists of modern commercial machines, such as water motors, water meters, vacuum pumps, hydraulic rams, heat motors, photometers, electric motors, voltmeters, ammeters, recording wattmeters, arc lamps, electric stoves, bridges, condensers, shunts, and discount meters.

The apparatus in the engineering laboratories is also available for use in the department of physics.

The *Department of Chemistry* occupies the west half of the fifth floor of the arts building. The lecture room has a seating capacity of three hundred. The laboratories for general, qualitative, and organic chemistry are equipped with water, gas and electric current, and contain hoods exhausted by electrically driven fans. The apparatus for the above courses is complete and modern. The quantitative and research laboratories are equipped with all the ordinary apparatus desirable for such work, including Sartorius and Becker balances. They also contain many more complicated pieces, such as combustion, assay, and bomb furnaces, Troemner assay balance, Parr's calorimeter, Junker's gas calorimeter, Browning spectroscope, Bausch and Lomb microscope, Abbe refractometer, Schmidt and Haensch polariscope, thermostat, Sargent's carbon combustion apparatus, and apparatus for gas and oil analysis and for electrolytic de-

terminations. The supply of chemicals is abundant and varied. The department library includes the best American, English, German, and French reference works and the current American and English periodicals.

The *Geographical and Geological Laboratory* equipment includes the following: A nearly complete set of the topographical atlas sheets of the United States Geological Survey; United States Coast and Goedetic Survey charts and Geological folios; Mississippi and Missouri river charts; pilot charts of the Atlantic and Pacific Oceans; weather maps and charts; relief globe of the earth; relief maps of the continents; relief maps of the United States and of selected localities; collections of common rocks and minerals; several hundred lantern slides; Laing's plantarium, Morse's heliodon, and a four-inch refracting telescope; tables and facilities for molding topographical features; books of reference.

The *Biological Laboratory* has demonstration table with sink and gas supply; laboratory tables with individual lockers; thirteen compound microscopes; sixteen dissecting microscopes; the usual supply of glassware, reagents, etc.; mounted human and animal skeletons; charts; collections of preserved animal and plant specimens and dissections, of microscopic preparations, of lantern slides, of reference books.

The *Bacteriological Laboratory* is furnished with tables having water and gas supply and individual lockers with the usual apparatus; also with incubators, Arnold's sterilizer, hot-air sterilizer, other apparatus, books of reference. The same laboratory contains additional lockers and equipment for the class in household chemistry.

The two *Cooking Laboratories* have each individual accommodations for classes of sixteen students, and the usual kitchen equipment for cooking and serving in larger quantities.

Shops, Drawing Rooms, Sewing Rooms, Etc.

The *Elementary Woodshop* is on the fifth floor of the engineering building and is arranged to accommodate four classes of eighteen each. This shop is for hand work only. The benches are similar to those in the pattern shop, and are equipped with the necessary tools. Seats are arranged so that the students can

be given class instruction by practical demonstration and by lectures in which the stereopticon can be used. Special tools and supplies are kept in the tool room. The locker room is arranged with individual lockers.

The *Wood Turning Shop* is situated between the elementary wood shop and the pattern shop, and is equipped with eighteen lathes of various sizes and makes and the requisite tools and appliances. The lathes are driven by a ten-horse-power motor. Lockers for the students' work are located along one side of the shop. The locker and wash room opens off the shop.

The *Pattern Shop*, on the fifth floor, is arranged to accommodate four classes of sixteen each. It is equipped with eight double benches, each side of a bench having a locker in which the tools used by the students in general are kept, and four locked drawers in which are kept the edged tools used by individual students. The machines in the pattern shop are one 24-inch 12-foot, and three 16-inch 6-foot overhanging spindle lathes; two 12-inch 5-foot, and two 11-inch 4½-foot speed lathes; one 24-inch surface planer; one universal circular cut off and rip saw; one 36-inch band saw; one grindstone; one emery tool grinder; one trimmer, and one sand-papering machine. The band and circular saws and the planer are driven by individual electric motors. The lathes are driven from two line shafts, each one of which has an independent motor.

Special tools and supplies are kept in the tool room, and tools are issued to students on check. Conveniently located are a dry kiln and a room in which unfinished work is kept. An office and a class-room open off the shop.

The *Advanced and Elementary Machine Shops* are on the fourth floor and occupy two separate rooms. The shop at the north end of the building is for elementary machine work, and the south shop is for advanced work. Between the two shops and communicating with both is the tool and stock room, where all small tools and supplies are kept.

The equipment of the *Elementary Machine Shop* consists of one 12-inch 5-foot plain engine lathe; one 12-inch 5-foot engine lathe with draw chucks, taper attachment, and compound rest; three 14-inch 6-foot and one 15-inch 6-foot engine lathes, with taper attachments and compound rests; seven 14-inch 6-foot plain

engine lathes; two 12-inch 4-foot speed lathes; one 15-inch friction geared shaper; one 16-inch crank shaper; one No. 1½ Universal miller; one 18-inch drill press; one double-wet emery tool grinder; and sixteen vises, placed on a bench running along two sides of the shop. Near the entrance stands a case of small lockers in which the students keep their work and individual tools. The machines in this room are driven by a ten-horse power electric motor attached to the ceiling.

The *Advanced Machine Shop* is equipped with one 18-inch 12-foot engine lathe, with compound rest; one 26-inch 8-foot, and one 15-inch 6-foot engine lathe, with taper attachments; one 16-inch 8-foot engine lathe, with taper attachment and compound rest; one 14-inch 6-foot toolmakers' lathe, with taper and backing off attachments, compound rest, and draw chucks; one 12-inch 4-foot speed lathe; one No. 3 back geared screw machine, with wire feed; one No. 2 universal miller, with slotting and rack cutting attachments; one No. 3 universal miller, with universal vertical and circular attachments; one 12-inch by 30-inch universal grinder; one 26-inch rack shaper; one 24-inch by 24-inch by 6-foot planer; one 24-inch back-geared drill press; one 13-inch sensitive drill press; one No. 3 inclinable punching press; one combination emery wheel and disc grinder; one wet emery tool grinder; one universal cutter grinder; one circular metal cut-off saw; eight vises placed on wood benches along the walls on two sides of the shop, and three vises on iron benches on the erecting floor and among the machines. All the machines in this shop are driven by independent direct current electric motors, so connected as to give the necessary variations in speed. A one-ton 16-foot hand-power traveling crane, mounted in the center of the shop so that it can traverse the whole width of the building, provides for the handling of heavy work and parts of the machines and tools. In the tool room are kept the general tools and cutter holders belonging to the machines, all the small tools, scales, standard gauges, measuring instruments, supplies, and general stock used in the work of the shops. The tool room is in charge of an attendant, who, by means of the check system, issues tools to students as they are needed in the work. A class room and office open off the shop.

The *Forge Shop*, in the basement of the engineering build-

ing, is well lighted by windows on three sides. The equipment consists of one large forge for steam hammer work; one gas tempering forge; one brazing forge; one 200-pound steam hammer; one angle bender; one eye bender; one bolt header; anvils, forges, and tools for a class of sixteen in ordinary forge work. A 12-foot hand-power traveling crane handles large work for the steam hammer, large forge, and heating furnace. The smoke from the forges is taken away through down draft hoods by a 60-inch steel exhaust fan, and the blast is supplied by a 24-inch blower, both of which are driven by a 15-horse power motor. A post drill, a double emery grinder, and a power hack-saw are driven from a separate motor. A stock room and a class room open off the shop.

The *Foundry*, on the sixth floor of the engineering building, is well lighted from skylights in the roof and by windows in the side and end.

The molding floor is made of cedar block placed on end; the floor around the cupola and furnaces is of brick. There are places for sixteen students, each place having a molding floor and a bench, and each bench an equipment of shovel, riddles, rammers, bellows, and molders' small tools.

There is a well equipped core room with two core ovens, one heated by gas for small cores, and the other, 6 feet wide by 10 feet long by 7 feet high, heated by coke and equipped with a car 4 feet wide by 6 feet long. A track for the car runs under the crane for handling large cores and dry-sand molds. There are two permanent and two portable brass furnaces with a combined capacity of 800 pounds, and two cupolas, one a 16-inch, hung on trunnions, and the other, a 24-inch, standing on the floor. A one-ton 16-foot traveling crane with electric hoist covers the main floor of the foundry. The equipment includes a cleaning room with tumbling barrel, and a flask and pattern shop with 12-inch wood lathe. The machinery is driven by a 5-horse power motor.

A class room and office open off the foundry. A pattern storage room 20 feet by 60 feet opens off the charging platform. All the equipment with the exception of the motors and fan was built in the Institute shops.

The *Rooms for Drawing and Design* are in the engineering building, four on the sixth floor, two on the fifth floor, and one

on the fourth floor. They aggregate about five thousand square feet of floor space and are amply lighted and furnished. Their proximity to the foundry, pattern, and machine shops, makes it possible to co-ordinate, to an unusual degree, the design and the constructive branches.

The blue-print room is on the mezzanine floor above the sixth, and is approached through a drawing room on the sixth floor. It is equipped with a 40 by 52 inch curved glass blue-print machine, tracing files, and blue-print baths.

On the sixth floor of the Arts Building are ample accommodations with overhead light for the work in freehand drawing.

The *Pottery Rooms* are equipped for the manufacture of pottery as well as for giving instruction. The class room has modeling tables and wheels driven by electric motor. In the laboratory and kiln room are two kilns, chemicals, glazes and a glaze mill. The clay room is supplied with clays and a clay mixer.

The *Sewing Rooms* are four in number, situated on the sixth floor of the Arts Building, with overhead light. The largest room has accommodations for sixty students. The machine room is supplied with thirteen sewing machines, electric iron, and mirrors and screens for fitting. The millinery room accommodates twenty students, and is furnished with show-cases, models, etc. One of the sewing rooms contains a loom, a spinning wheel, and other apparatus provided for the work in textiles.

The *Lunch Room* and *Kitchen* is located on the first floor of the Engineering Building. There is also a lunch room in connection with the cooking laboratories on the fifth floor of the Arts Building.

Libraries

The main library consists of about seventeen thousand volumes, and about three thousand pamphlets, selected with immediate reference to the needs of each department. It is essentially a working library, containing all necessary reference works, together with representative books in the various sec-

tions of history, biography, literature, fine arts, engineering, mathematics, physics, chemistry, philosophy, philology, and sociology. One hundred and sixty-three periodicals are currently received.

Throughout the school year the libraries are open from eight A. M. to five P. M.; during the session of the night school the hour for closing is nine P. M. The students at all times have free access to the shelves. Library assistants serve in turn at the reference desk and assist in making the students familiar with the arrangement of the books and the use of the dictionary catalogue. The catalogue is a clear, simple guide to the resources of the library, free from confusing technicalities. The Dewey system of classification is used, with Cutter book numbers.

Students in Attendance, 1909-10.

The names of students taking evening or summer courses are not included in these lists.

College Students.

The figures after the names indicate the number of courses of instruction completed without conditions at the close of the year ending in August, 1910, above and beyond the fifteen admission units.

Engineering College Students.

Adams, Clyde LeRoy.....	43	Hauber, Clemens	22
Ahrens, Walter Robert.....	37	Havens, Fred L.....	36
Anderson, Wilbur Clarence. 18		Hazelwood, Paul Joseph....	6
Avery, Harold G.....		Henderson, Alexander Swift	6
Bacon, Malcolm	26	Herrmann, Charles Leon....	4
Baker, George W.....	24	Hildebrandt, George	23
Barber, Robin Henin.....	36	Hill, Nathaniel	9
Bartik, Charles	11	Hoadley, George Lee.....	40
Bassett, Cyrus White.....	32	Hochstadter, Benjamin	10
Benjamin, Merrill	12	Hodges, Albert B.....	37
Biesemeier, Robert Fred'rick	20	Iverson, Roy	6
Bowes, Lawrence Cecil.....	16	Johnson, George Lester....	20
Brand, Paul	36	Kaindl, Arthur Michael....	37
Bronson, Clifford B.....	16	Kaiser, Everett Dae.....	35
Burke, Harry James.....	36	Kane, Paul	38
Bush, George Chester.....	34	Kidder, Walter	41
Carlson, Harry Joseph.....	3	Klamt, Edward	28
Carpenter, Charles Irving...	38	Klein, William Frederick...	33
Charlton, James B.....	25	Kokes, Joseph E.....	4
Connelly, Harry	36	Lampert, Henry Herman....	6
Corliss, John Lester.....	7	Larsen, Elmer Carl.....	18
Curtis, Arthur J. R.....	38	Larsen, Reginald Lester....	12
Dutt, Joges Chandra.....	36	Leman, Edwin D.....	25
Dempsey, Ewald	24	Lelley, Orrin A.....	9
Donaldson, J. Crawford....	21	Loeding, J. George.....	29
Dykstra, John Edward.....	36	Loven, Walter John.....	24
Edwards, Lester Richard...	20	McGrath, John Dalley.....	30
Feely, Frank	30	McKee, Eustis Ewart.....	3
Fensholt, Adolph H.....	12	Miller, Arthur	16
Forster, Henry	34	Moore, Charles Henry.....	9
Frydendall, Archie Danforth	15	Murphy, Kenneth Wayne...	10
Gamble, Merritt Campbell..	6	Myers, Frank Edward.....	36
Gibbs, Charles Amory.....	23	Obergfell, Ralph Marshall...	35
Golden, Walter	12	Pardee, Theron	30
Gollinkin, George Bernard...	3	Perlow, Arthur Raymond...	41
Harvey, Arthur Homer.....	41	Petersen, Theodore Wald'r.	15

STUDENTS IN ATTENDANCE.

67

Peterson, Hervey E.....	20	Small, Elmer Stiles.....	35
Philbrick, Fred C.....	18	Smith, Harold Kellogg.....	6
Pierce, Irving Harry.....	9	Sommerfield, Nate	4
Price, William Henry.....	6	Spies, Philip Matthew.....	6
Reger, John E.....	21	Stoll, Walter	8
Reisenhus, James Arthur...	27	Strauss, Edward Emil.....	33
Rogers, Frank Ely.....	10	Sumkowski, Alfons Julius..	23
Rubenstein, Nathan	9	Supple, Lee Francis.....	7
Ryan, Lawrence	9	Tischer, Arthur Herman....	13
Schaedel, Victor Emil.....	24	Travis, Lawrence LeValley..	9
Schrader, Paul J.....	8	Uhlhorn, Walter	42
Sharp, Augustus Wm., Jr...	40	Weiss, Sidney William.....	9
Sheldon, Arthur Curtis.....	9	Wyman, Laurence West....	37
Sherman, Oren Gray.....	48	Zielaskowski, Frank	7
Shewmon, Dan D.....	36	Zitzewitz, Walter	28

Science and Arts College Students.

Adams, Gladys Madeline....	20	Farnsworth, Editha	20
Albee, Nellie Blye.....	20	Felt, Winifred	24
Arnold, Esther Margaret....	14	Fischer, Frances Julia.....	10
Atkins, Mary Lyons.....	10	Fitzgerald, Mildred	8
Austin, Eva Marie.....	10	Foley, Alexander	7
Ayres, Elizabeth Farnan....	15	Furlong, Mary Elizabeth....	10
Bahnsen, Bertha	11	Gibbs, Fletcher Barker, Jr..	10
Barber, Louise	2	Gleason, Pauline	22
Barnett, Albert G.....	3	Goldberg, Minnie	3
Barr, Marjorie	6	Gould, Helen	6
Batchelor, Gertrude H.....	11	Grant, Louise Ray.....	9
Batchelor, Mary	15	Grassley, Florence Olmsted..	10
Benedict, Lloyd George....	9	Gray, Blanche	18
Benziger, Frank William....	16	Griswold, Catherine	20
Bernstein, Esther	9	Griswold, Florence Marg'rite	10
Billups, Irene Edna.....	7	Hannan, Helen Adelaide....	18
Brought, Frank Milton.....	9	Hartsburg, Frances Mabel..	10
Brazleton, Marion Frances..	6	Hatch, Elizabeth	24
Burton, Russell Fetter.....	7	Hatch, Louise	11
Canaday, Alice Creighton...	10	Hautau, Emma	18
Canaday, Sophia Matilda....	10	Hawker, Mabel	3
Carey, Kathleen	9	Hench, Ralph	9
Cederholm, May	18	Henderson, Ruth	10
Clark, Frances Beardsley...	3	Henley, Electa Alva.....	20
Cohn, Michael J.....	20	Holbo, Mary	20
Cole, Sarah Edith.....	6	Hood, Clara Louise.....	20
Collins, Ruth Miriam.....	10	Hood, Ethel May.....	9
Costello, Maude Marie.....	10	Howe, Amy	12
Coutts, Isabella Wallace....	20	Ilett, Marie	9
Crosman, Ruth	20	Johnson, Edith Geneva.....	9
Cushing, Thurber Wesson...	18	Jones, Bessie Gardiner.....	20
Decker, Anna Frances.....	18	Jones, Elta	10
Dickinson, Fred Wilton....	21	Kazda, Charles Bohumel....	16
Dincher, Grace Kathryn....	10	Keeler, Anna Estella.....	35
Eastman, Helen Darling....	22	Kelly, Frances	16
Ebersole, Amanda	22	Kruger, Ada Rowena.....	21
Ehrhardt, Alwin William....	10	Kuderna, Jerome George....	18
Ellsberry, Palmer Ready....	10	Langan, Arthur John.....	5
Epstein, Albert	9	Lange, Caroline Louise.....	10
Falner, Emanuel	18	Levin, Isadore	6

Livingston, Katherine	10	Roberts, Dorothy Bradley...	18
Loeding, Sophie	20	Ronshausen, Clara	17
Lowry, Robert Henry.....	22	Roquet, Kate Clare.....	4
Mallon, Marguerite	10	Rosseland, Frederick Martin.	9
Mangan, Hazel Grace.....	10	Rossland, Emily Jennie.....	20
Martens, Elsebeth Louise...	24	Roth, Helen	19
Marin, Verna Kirk.....	21	Ruediger, Clara	9
Mather, Ruth	10	Salisbury, Howard Darius...	7
McLaughlin, Frances Marion	10	Scholes, Bonnie Elizabeth...	12
McNaul, De Ette Armina....	22	Sexton, Alice	6
Meyer, Katherine Frederica.	9	Shelly, Pearl Grace.....	20
Moiles, Edna May.....	4	Simpson, Helen Shirley....	10
Montgomery, Ada Marie....	20	Snow, Jane Belle.....	20
Morgan, Mae	20	Southwick, Elizabeth A....	5
Nagl, Marie	18	Spencer, May Sarah.....	20
Nath, Kathryn	12	Stevens, Maude America....	4
Nelson, Klara Benedict....	20	Stewart, Louise Gertrude...	22
Neville, May	10	Stoddard, Hazel	10
Nicol, Jessie M.....	12	Street, Helen Della.....	7
Nicholson, Alice Eunice....	20	Stronach, Linnie Viola.....	10
Nixon, Bertha Louise.....	12	Tonnesen, Louise	18
Norton, Florence Ford.....	24	Turnbull, Florence	28
Nuese, Freida Carolyn.....	6	Ullerick, Helen May.....	18
O'Brien, Sarah	20	Warren, Homer Samuel.....	7
Orr, Irene Marie.....	8	Watts, Walter Kelsey.....	3
Oswald, Alma Minnie.....	24	Weaver, Mrs. Isabella M....	12
Paulk, Marie Lucinda.....	10	Weber, Edith	4
Paulsen, Hannah Mabel....	21	Weyand, Louise Anna.....	26
Peake, Frederick Burbank..	13	Williams, Grace Louise....	10
Phelan, Margaret	9	Williams, Jeanette Agnew..	10
Pierce, Cornelia	18	Williams, Margaret Florence	6
Pond, Ethel Jean.....	20	Williams, Queenie Ruth....	4
Porter, Sarah	7	Wilson, Agnes Costin.....	10
Rabens, Isadore	6	Wilson, Corinne Lee.....	10
Raymer, Alice	3	Wintermeyer, Elsa	18
Raymond, Albert William...	3	Wood, Edna	9
Reynolds, Mildred Valdean..	3	Yaxley, Leona Della.....	19
Rieser, Leonard Joseph....	3	Zimmerman, Irene Mehrhoff.	6

Unclassified College Students.

Alken, Robert	Felch, Clara Maud
Antonison, Arthur	Fitzmaurice, Blanche
Belanyi, Zoltan	Gibbons, Bessie
Benson, Oliver Richard	Hall, Mildred L.
Blatchford, John	Ho, Suy Chung
Bonney, Mrs. Olive Baker	Horwich, Adeline
Bourgeois, Borel Oscar	Johnston, William
Brickwood, Beatrice Marguerite	Klest, Anna Katherine
Burg, Bernard	Kimbell, Elizabeth Maria
Comstock, Frank James	McManus, Grace
Darnall, C. Allen	Meyers, Samuel
Degner, Rowe Omer	Mitchell, Ralph Allen
Dernbach, William Adam	Moeller, Margaret Theresa
Doherty, Margie	Murdock, Winifred Dudley
Du Plessis, Natalie	Niederman, Malvina Dorothy
Ebersole, Fannie Turner	Reid, Mercedes Kilner
Eldredge, William Strickland	Rest, Sarah

STUDENTS IN ATTENDANCE.

69

Sherman, Parsi Ram
 Sherman, Mrs. Carrie Turner
 Simonini, Paul Charles
 Smith, Clara
 Solon, Israel
 Turner, Claire Brown
 Tuttle, Ethel Elizabeth

Vanderpoel, Allan Wilfred
 Van Nostrand, Lois
 White, Margaret Jean
 Williams, Edith Cadwallader
 Winchell, Arthur Benjamin
 Wu, Niequong
 Youngman, Hazel Elizabeth

Academy Students.

The figures after the names indicate the numbers completed at the close of the year ending in August, 1910. For definition of unit, see page 13.

Abbott, Lawrence Howard...	8	Blandin, Sherman	7
Abbott, Howard Edward....	3	Blanding, George Harvey....	11
Abram, Milton	12	Blezinger, Helen Ruth	15
Abram, Theresa		Block, Louis Herman.....	6
Addle, Albert Holmes		Bloss, William	4
Ahlswede, Ruth	9	Boessel, Frederick Harrison.	3
Allan, James Ramsey.....	10	Boettcher, Fred	3
Allyn, Hosmer Holland.....	15	Bolger, Mayme Esther.....	4
Alsip, Ruth	7	Boulton, Florence Ruth.....	15
Alsip, Ruth K.....	2	Bradley, Eleanor	8
Ammentorp, Geo. Christian.	8	Bradley, Paul Russell.....	4
Anderson, Andrew J. A.....	15	Brand, William Otto	4
Anderson, LeRoy Christ....	12	Brandenburg, Walter H.....	4
Andrews, Loene Morley....		Brannum, Marjorie	5
Arnold, Emily	9	Breckan, Harris	11
Atkinson, Gustav Eman., Jr.	3	Brenton, Robert Redfield....	15
Augensen, Alfred	4	Breyer, Charles Conrad, Jr..	9
Axelson, Lester Martin.....	6	Breyer, Hazel	12
Bagby, Robert Bartlett.....	15	Bron, Grovert Harry.....	3
Bain, Foree, Jr.....	7	Brown, Cecil Augner.....	12
Baldwin, Edith Myrtle.....		Burgess, Forest Junius.....	
Ballard, Mary Esther.....	11	Burroughs, Mary Evelyn....	7
Bankes, Mabel Hester.....	4	Burroughs, Studley Oldham.	11
Baragwanath, Cecil	8	Bye, Herbert William.....	15
Baragwanath, Ruth Emily... 11		Campbell, Stuart MacMurray	10
Barler, Richard Candon....	11	Cann, LeRoy Raymond.....	7
Barney, Harriet May.....	1	Carden, Joseph John.....	11
Bartelme, Clarence Michael.	6	Carey, Charles Henry.....	12
Bartelt, William	10	Carlisle, Ruth	8
Bates, John Michael.....	10	Carlson, Martin A. W.....	15
Bates, Margaret Mary.....	6	Carney, Peter Walter.....	2
Baumgartner, June	8	Cass, Almina	5
Beattie, Gladys	8	Caugherty, Grace	6
Becker, Albert Raymond....	15	Caugherty, Hazel Marie....	6
Becker, Augustina Irma....	6	Chamberlain, Rebecca	15
Becker, Minnie	3	Chamberlain, Paul Wheelock	6
Beckert, LeRoy Charles....		Chan, Hing Wan.....	4
Beckert, LeRoy Charles....		Chapin, William Morton....	2
Beezley, Ruth Allen.....		Childs, Leslie Oliver.....	11
Behrens, Paul Ellsworth....	7	Chmelik, Frank Joseph....	11
Benson, Myrtle	4	Clark, Leonard Dudley.....	7
Bernbrock, Merrill Leroy....	4	Clark, Margaret Marie.....	
Bilek, Joseph	15	Clausen, David Chester.....	11
Bilster, Halsey, Carl.....	12	Clausen, Harry Richard....	3
Bindeman, Grace	15	Cohen, Edith	
Birdsall, Elsie	15	Cohen, Lily	4
Bischmann, Otto August....	9	Cole, Alice Belle.....	8
Bjorkland, Wallace	2	Condit, Harold Scribner....	12

Livingston, Katherine	10	Roberts, Dorothy Bradley...	18
Loeding, Sophie	20	Ronshausen, Clara	17
Lowry, Robert Henry.....	22	Roquet, Kate Clare.....	4
Mallon, Marguerite	10	Rosseland, Frederick Martin.	9
Mangan, Hazel Grace.....	10	Rossland, Emily Jennie.....	20
Martens, Elsebeth Louise...	24	Roth, Helen	19
Marin, Verna Kirk.....	21	Ruediger, Clara	9
Mather, Ruth	10	Salisbury, Howard Darius...	7
McLaughlin, Frances Marion	10	Scholes, Bonnie Elizabeth...	12
McNaul, De Ette Armina....	22	Sexton, Alice	6
Meyer, Katherine Frederica.	9	Shelly, Pearl Grace.....	20
Moiles, Edna May.....	4	Simpson, Helen Shirley.....	10
Montgomery, Ada Marie....	20	Snow, Jane Belle.....	20
Morgan, Mae	20	Southwick, Elizabeth A.....	5
Nagl, Marie	18	Spencer, May Sarah.....	20
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Nixon, Bertha Louise.....	12	Tonnesen, Louise	18
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Nuese, Freida Carolyn.....	6	Ullerick, Helen May.....	18
O'Brien, Sarah	20	Warren, Homer Samuel.....	7
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Oswald, Alma Minnie.....	24	Weaver, Mrs. Isabella M....	12
Paulk, Marie Lucinda.....	10	Weber, Edith	4
Paulsen, Hannah Mabel....	21	Weyand, Louise Anna.....	26
Peake, Frederick Burbank..	13	Williams, Grace Louise.....	10
Phelan, Margaret	9	Williams, Jeanette Agnew..	10
Pierce, Cornelia	18	Williams, Margaret Florence	6
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Burg, Bernard	Kimbell, Elizabeth Maria
Comstock, Frank James	McManus, Grace
Darnall, C. Allen	Meyers, Samuel
Degner, Rowe Omer	Mitchell, Ralph Allen
Dernbach, William Adam	Moeller, Margaret Theresa
Doherty, Margie	Murdock, Winifred Dudley
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 Wu, Nieuquong
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Academy Students.

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McLaughlin, Frances Marlon	10	Scholes, Bonnie Elizabeth...	12
McNaul, De Ette Armina...	22	Sexton, Alice	6
Meyer, Katherine Frederica.	9	Shelly, Pearl Grace	20
Molles, Edna May	4	Simpson, Helen Shirley	10
Montgomery, Ada Marie...	20	Snow, Jane Belle	20
Morgan, Mae	20	Southwick, Elizabeth A.	5
Nagl, Marie	18	Spencer, May Sarah	20
Nath, Kathryn	12	Stevens, Maude America....	4
Nelson, Klara Benedict....	20	Stewart, Louise Gertrude...	22
Neville, May	10	Stoddard, Hazel	10
Nicol, Jessie M.	12	Street, Helen Delia	7
Nicholson, Alice Eunice...	20	Stronach, Linnie Viola	10
Nixon, Bertha Louise	12	Tonnesen, Louise	18
Norton, Florence Ford	24	Turnbull, Florence	28
Nuese, Freida Carolyn	6	Ullerick, Helen May	18
O'Brien, Sarah	20	Warren, Homer Samuel	7
Orr, Irene Marie	8	Watts, Walter Kelsey	3
Oswald, Alma Minnie	24	Weaver, Mrs. Isabella M.	12
Paulk, Marie Lucinda	10	Weber, Edith	4
Paulsen, Hannah Mabel	21	Weyand, Louise Anna	26
Peake, Frederick Burbank..	13	Williams, Grace Louise	10
Phelan, Margaret	9	Williams, Jeanette Agnew..	10
Pierce, Cornelia	18	Williams, Margaret Florence	6
Pond, Ethel Jean	20	Williams, Queenie Ruth	4
Porter, Sarah	7	Willson, Agnes Costin	10
Rabens, Isadore	6	Wilson, Corinne Lee	10
Raymer, Alice	3	Wintermeyer, Elsa	18
Raymond, Albert William...	3	Wood, Edna	9
Reynolds, Mildred Valdean..	3	Yaxley, Leona Delia	19
Rieser, Leonard Joseph	3	Zimmerman, Irene Mehrhoff.	6

Unclassified College Students.

Alken, Robert	Felch, Clara Maud
Antonison, Arthur	Fitzmaurice, Blanche
Belanyi, Zoltan	Gibbons, Bessie
Benson, Oliver Richard	Hall, Mildred L.
Blatchford, John	Ho, Suy Chung
Bonney, Mrs. Olive Baker	Horwich, Adeline
Bourgeois, Borel Oscar	Johnston, William
Brickwood, Beatrice Marguerite	Kiest, Anna Katherine
Burg, Bernard	Kimbell, Elizabeth Maria
Comstock, Frank James	McManus, Grace
Darnall, C. Allen	Meyers, Samuel
Degner, Rowe Omer	Mitchell, Ralph Allen
Dernbach, William Adam	Moeller, Margaret Theresa
Doherty, Margie	Murdock, Winifred Dudley
Du Plessis, Natalie	Niederman, Malvina Dorothy
Ebersole, Fannie Turner	Reld, Mercedes Kilner
Eldredge, William Strickland	Rest, Sarah

STUDENTS IN ATTENDANCE.

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Sherman, Parsi Ram
 Sherman, Mrs. Carrie Turner
 Simonini, Paul Charles
 Smith, Clara
 Solon, Israel
 Turner, Claire Brown
 Tuttle, Ethel Elizabeth

Vanderpoel, Allan Wilfred
 Van Nostrand, Lois
 White, Margaret Jean
 Williams, Edith Cadwallader
 Winchell, Arthur Benjamin
 Wu, Niequong
 Youngman, Hazel Elizabeth

Academy Students.

The figures after the names indicate the numbers completed at the close of the year ending in August, 1910. For definition of unit, see page 13.

Abbott, Lawrence Howard..	8	Blandin, Sherman	7
Abbott, Howard Edward....	3	Blanding, George Harvey....	11
Abram, Milton	12	Blezinger, Helen Ruth.....	15
Abram, Theresa		Block, Louis Herman.....	6
Addle, Albert Holmes		Bloss, William	4
Ahlswede, Ruth	9	Boessel, Frederick Harrison.	3
Allan, James Ramsey.....	10	Boettcher, Fred	3
Allyn, Hosmer Holland.....	15	Bolger, Mayme Esther.....	4
Alsip, Ruth	7	Boulton, Florence Ruth.....	15
Alsip, Ruth K.....	2	Bradley, Eleanor	8
Ammentorp, Geo. Christian.	8	Bradley, Paul Russell.....	4
Anderson, Andrew J. A.....	15	Brand, William Otto	4
Anderson, LeRoy Christ....	12	Brandenburg, Walter H.....	4
Andrews, Loene Morley.....		Brannum, Marjorie	5
Arnold, Emily	9	Breckan, Harris	11
Atkinson, Gustav Eman., Jr.	3	Brenton, Robert Redfield....	15
Augensen, Alfred	4	Breyer, Charles Conrad, Jr..	9
Axelson, Lester Martin.....	6	Breyer, Hazel	12
Bagby, Robert Bartlett.....	15	Bron, Grovert Harry.....	3
Bain, Foree, Jr.....	7	Brown, Cecil Augner.....	12
Baldwin, Edith Myrtle.....		Burgess, Forest Junius.....	
Ballard, Mary Esther.....	11	Burroughs, Mary Evelyn....	7
Bankes, Mabel Hester.....	4	Burroughs, Studley Oldham.	11
Baragwanath, Cecil	8	Bye, Herbert William.....	15
Baragwanath, Ruth Emily... 11		Campbell, Stuart MacMurray	10
Barler, Richard Candon....	11	Cann, LeRoy Raymond.....	7
Barney, Harriet May.....	1	Carden, Joseph John.....	11
Bartelme, Clarence Michael.	6	Carey, Charles Henry.....	12
Bartelt, William	10	Carlisle, Ruth	8
Bates, John Michael.....	10	Carlson, Martin A. W.....	15
Bates, Margaret Mary.....	6	Carney, Peter Walter.....	2
Baumgartner, June	8	Cass, Almina	5
Beattie, Gladys	8	Caugherty, Grace	6
Becker, Albert Raymond....	15	Caugherty, Hazel Marie....	6
Becker, Augustina Irma....	6	Chamberlain, Rebecca	15
Becker, Minnie	3	Chamberlain, Paul Wheelock	6
Beckert, LeRoy Charles.....		Chan, Hing Wan.....	4
Beckert, LeRoy Charles.....		Chapin, William Morton....	2
Beezley, Ruth Allen.....		Childs, Leslie Oliver.....	11
Behrens, Paul Ellsworth....	7	Chmelik, Frank Joseph.....	11
Benson, Myrtle	4	Clark, Leonard Dudley.....	7
Bernbrock, Merrill Leroy....	4	Clark, Margaret Marie.....	
Bilek, Joseph	15	Clausen, David Chester.....	11
Bilster, Halsey, Carl.....	12	Clausen, Harry Richard....	3
Bindeman, Grace	15	Cohen, Edith	
Birdsall, Elsie	15	Cohen, Lily	4
Bischmann, Otto August....	9	Cole, Alice Belle.....	8
Bjorkland, Wallace	2	Condit, Harold Scribner....	12

Lovett, William	4	Miller, Herbert Edgar	
Ludwig, Pearl Ethel	8	Mills, Faith	
Ludwigs, Arthur Charles	8	Minch, Arnold John	8
Luhnnow, Elmer Christen	11	Minchin, Sidney	10
Luhnnow, Harold	4	Misch, Harry	9
Luhnnow, Walter Frederick	15	Misch, Louis	15
Lyon, George Loder	9	Moeller, John Fred	5
Mable, Don C	12	Moeller, Walter John	6
MacDonald, Annie Shaw	4	Moody, Helen Rose	15
MacIsaac, Donald	3	Moore, Marlin	
MacPherson, William John	12	Moran, Winifred Helen	10
MacVicar, James Stephen	13	Morgan, Thomas J	8
Madsen, Rose	4	Morris, Helen	12
Madsen, Ruby Cella		Morris, Edna Pauline	4
Magnut, Marie	12	Mott, Edgar Clayton	15
Magnusson, Lawrence	3	Moulton, Harper Henry	15
Maly, Libbie		Moulton, Wesley Hillman	9
Mankowitz, Alice		Moy, Cheung Fook	3
Mann, Clarence Ezra	4	Mueller, Jacob Edward	5
Mann, Edwin Judson	15	Mueller, Theodore Louis	12
Mann, Marjorie Ridpath	13	Murray, William Francis	
Marks, Arnold	3	Nachtway Gertrude	8
Marnell, Catherine	10	Nadel, George L	
Marsh, Ethel Augusta	6	Neeley, Anna Louise	7
Marston, Frances Kathryn	2	Nelson, Arthur William	9
Martens, Harold Henry	4	Nelson, Carl Frederick	3
Martin, Charles Edward	3	Nelson, Marie Josephine	15
Martin, Raymond Patrick	2	Nuendorf, Otto	3
Martin, Robert Sackett	15	Newberry, Nina	
Maschek, Robert Joseph	4	Newell, Laurence Plympton	10
May, Irma Edith Virginia	15	Nielsen, Johanna Margaret	3
May, Mildred Theresa	5	Nieman, Byron Weasa	15
McCabe, James Bradbury		Nigro, Rocco	8
McCann, Elizabeth C	6	Nilsen, Edmund	2
McChesney, Alice Anna	8	Nordahl, Evelyn	8
McClanahan, Alice May	12	Norgard, Paul	
McClanahan, Bayard Glenn	8	Norkin, Mathilda	4
McClanahan, Miles Fletcher	7	Norris, Katherine	11
McConnell, Cornelia Egbert	7	Novak, Otto Edward	4
McCune, Perry Edwards	7	Nowak, Rose Harriet	11
McDonald, John Arthur	11	Obermaier, Joseph	4
McDonald, John Dunn	6	O'Brien, James C., Jr	4
McDonald, Marguerite	15	O'Brien, Ruth Catherine	15
McGowen, Franklin Hopkins	5	Ogden, David Batchelder	5
McGuire, Martha Browne	9	Ogden, Frank Edmund	6
McIntyre, Rupert Alonzo	4	Olaison, Edna Alvilda	7
McKay, Stuart	9	Olesen, Marie Georgine	11
McKee, Selma Augusta	11	O'Neill, Eugene	11
McNeal, Harold Edwin	7	Ortengren, Helmer Gustav	
McNutt, Patterson		Overstreet, Albert Phillips	
Meidinger Harold	9	Painter, Walter	12
Meiling, Carl Gustav	6	Parker, Walton	15
Meinung, Richard, Jr	2	Parks, Clarence Runyan	15
Mension, Walter Albert	3	Parsley, Mannie Nutt	7
Meslow, Nina	9	Paskind, Jacob	7
Messier Valois Elwyn	15	Paysen, Gertrude Charlotte	4
Meyer, Edna Marie	7	Peabody, Hugh Kingman	
Mikkleson, Robert	12	Pedersen, Arthur A	8
Millar, Frank Washington	6	Pentecost, Damaris	
Miller, Benjamin Harry	9	Peters, Elsa	15

STUDENTS IN ATTENDANCE.

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Petersen, Louis Andrew....	8	Seligman, Samuel	10
Peterson, Arvid R. L.....	9	Shea, Arthur James.....	
Peterson, Bijou	5	Shea, Thomas Francis.....	3
Peterson, Elmer Leroy.....	4	Shopera, Henry Nathan....	9
Phillips, Harvey	4	Sibal, Louis, Jr.....	4
Phillis, Joy Adele.....	9	Siegel, David	7
Pieper, Arthur Robert.....		Silverman, Meyer Joy.....	11
Pilat, Gertrude Helen.....	9	Simon, Harriet	7
Pinkert, Martha	5	Simonek, Frederick Ludwig.	
Piper, Julia Marie.....	3	Simons, Rose	5
Polakow, Maurice		Sladek, Edward Frank.....	8
Popp, Edwin	4	Slocum, Caryl	9
Porter, Edwin Margraff....	15	Smith, Clarence Phillip....	9
Porto, Dominick	7	Smith, Mary Ethel Lourdes..	12
Prout, Edgar	4	Smith, Helen	10
Puster, Margaret Emrich....	15	Snow, Rolland Kent.....	5
Putz, Ethel	8	Soest, Alfred August.....	12
Rand, Esther	3	Spear, Zoa Virginia.....	7
Rankin, Ray Emerson.....	9	Spector, William Jacob....	2
Ransom, Marjorie	3	Spiehr, Enola Segrid.....	8
Raymer, Ellen May.....	10	Spitzer, Edith	5
Reck, John	5	Steinberg, Selma F.....	2
Reed, Esther	11	Steinert, Rolland T.....	4
Reichel, Albert Sunderlin..	15	Stephens, Harold Alfred....	15
Richards, Marmet Austin....	13	Stephens, Ralph Cedric....	12
Riddiford, Rubie	4	Stephenson, Guy	6
Robinson, Hugh Chenoweth..	15	Steuer, Joseph True.....	10
Robinson, Raymond Dudley..	10	Stevenson, David Robert....	11
Rochford, Waldron Joseph..		Stevenson, Warren Lester..	3
Roeschlaub, Genevieve S....	11	Stewart, George Ross.....	9
Rogge, Martha		Stiles, Norman Camp.....	
Rojahn, Edna Alberta.....	15	Stirton, James	12
Roos, Dora	4	Street, John A., Jr.....	6
Ross, Harold McBain.....	11	Strickland, Robert Tiras....	10
Roth, Walter Sherman.....	11	Stromberg, Eva	5
Rubel, Florence Nancy.....	5	Stucker, Urban Lucas.....	10
Russell, John Albert.....	15	Sturges, Frank, Jr.....	8
Russell, Edward Gorden....	7	Sullivan, Desmond Thomas..	12
Rutherford, John Joseph....	15	Supple, Omer Edmund.....	13
Ryan, Jeannette	8	Swanson, Charles	12
Sandell, Enoch	8	Sweet, James	
Sanders, Carl	8	Tarracciano, Alexander	15
Sanders, Henry August.....	12	Tauber, William	5
Sauer, Joseph	10	Taylor, Forrest Charles....	7
Savage, George Edward.....	12	Tehle, Charles John.....	16
Saxon, James Christian....	15	Terwilliger, Irene B.....	3
Schaye, Paul	11	Terwilliger, Louise E.....	4
Schlangen, Nicholas		Thelin, Eric Blaine.....	7
Schmidt, Leo	2	Theobald, William	7
Schmidt, Neil May.....	15	Thoma, Edward Gustave....	7
Schmuckal, Herbert Ehrhardt	2	Thomas, Clifton Moore.....	15
Schoeninger, Adolph	9	Thomas, Edwin Benjamin....	12
Schumacher, Arthur	12	Thomas, Patrice Jessie.....	11
Schwartz, Samuel	15	Thompson, Celia Dorothy...	15
Schweizer, Eugene Peter....	3	Thomson, Earl Sanderson...	6
Schwinn, Frank	6	Titus, Harold Earle.....	15
Scott, William Blair, Jr....	3	Titus, Virginia	10
Seaberg, Grover Ernest....	3	Toban, Frank	10
Sears, Norma	11	Toban, Richard	5
Selter, Kasson Walter.....	9	Torrison, Margaret Agatha..	15

Triebull, Erwin Fred.....	4	White, John Preble.....	4
Triner, Libbie Josephine....	6	Whitley, Ralph S.....	6
Troyke, Louis	15	Whitney, Douglass Leslie...	3
Turner, Arthur Charles.....	15	Widman, Frank Theodore...	3
Tweddle, Thomas Park.....	2	Wiener, Hildegard	8
Vavrinek, Edward Joseph....	15	Wilk, Jennie	3
Vermaas, Anita Marie.....	2	Wilcox, Albyn Adams.....	11
Vockel, Clarence	11	Wilcox, Bernice May.....	6
Vognild, Elvira Amanda.....	15	Wilcox, Hayden Merton....	2
Volberding, Harry Henry....	15	Wilder, Faustine Loranda...	15
Vondras, Charles A.....	3	Williams, Gertrude	
Voss, Irving Joe.....	3	Williams, Gladys May.....	
Voss, Louis	15	Williams, Ruth	
Walduck, Lorna	8	Wilson, James Dell.....	8
Walker, Fenno	3	Wilson, Klaburn	3
Walther, Charles Brock.....	10	Wilson, Oscar James.....	15
Warloe, Elinor	11	Wilson, Stuart James.....	10
Warner, Elmer Crosby.....	3	Winkler, Alma	
Walthier, Lionel Joseph....	3	Winterson, Elsie Dorothy...	
Watson, Wallace Carl.....		Wirth, Orville Leonard....	4
Weekes, Robert William....	4	Wise, Frank John.....	15
Weesies, Ruth	3	Wolff, Rudolph	3
Weil, Martin	8	Woodhall, William Horton..	8
Weinberg, Benjamin	8	Woodworth, Paul Merryless..	3
Weinhardt, Erwin Hugo.....		Yaxley, William Ernest....	15
Welch, Mary Eldora.....	15	Zimmerling, Raymond Oscar	3
Wells, Katherine	15	Zuckerman, David	2
Westen, William	4		

Students in Co-operative Course in Mechanic Arts

Boys and Employes

First Year

Allie, George, Union Special Machine Company.	Hyer, James, Roth Bros. Com- pany.
Armonda, John, Union Special Machine Company.	Jahnke, Herbert, Roth Bros. Company.
Blake, Arnold, Pelouze Electric Heater Company.	Johnson, Trygre, Miehle Print- ing Press Manufacturing Com- pany.
Boerlin, Harold, Westinghouse Nernst Lamp Company.	Jordan, Chester, Union Special Machine Company.
Bowler, Timothy, Woods Motor Vehicle Company.	Kerrins, George, Aermotor Com- pany.
Burnstein, Henry, E. Goldman & Co.	Klug, Willett, Roth Bros. Com- pany.
Ellerton, Maurice Haynes, Han- na Engineering Company.	Meyer, Fred A., Gregory Elec- tric Company.
Erickson, George, Aermotor Company.	Micetich, Thomas, Union Spe- cial Machine Company.
Farquharson, June, Westing- house Nernst Lamp Company.	Miller, Victor, Weller Manufac- turing Company.
Greathouse, Sylvester, Sullivan Machine Company.	Mueller, Jacob, Aermotor Com- pany.
Grodsky, Morris, Gregory Man- ufacturing Company.	Murton, Robert, Goodman Man- ufacturing Company.
Hill, David, Link Belt Company.	

Norgaard, Paul, Gregory Manufacturing Company.
 Payne, Paul A., Aermotor Company.
 Prescott, Ralph, E. Goldman & Company.
 Saxon, William, Miehle Printing Press Manufacturing Company.
 Schabow, Arthur, Aermotor Company.
 Schaeffer, Gus, Hanna Engineering Company.
 Sclavon, Marion, Union Special Machine Company.
 Sieloff, Fred, Link Belt Machinery Company.

Smith, James, Allis-Chalmers Company.
 Smith, Joseph, Gregory Manufacturing Company.
 Wallace, Everett, Sullivan Machinery Company.
 Watkins, Burgoyne, Link Belt Company.
 White, Roy, Woods Motor Vehicle Company.
 Wohl, Julius, Aermotor Company.
 Zaleski, Ray, Aermotor Company.

Second Year.

Beckett, Merrill, Allis-Chalmers Company.
 Doskocil, Erwin, Union Special Machine Company.
 Ehrlich, Ralph, Woods Motor Vehicle Company.
 Erhard, Edward, Hanna Engineering Company.
 Fork, William, Acme Steel Goods Company.
 Gould, Russell, Sullivan Machinery Company.
 Grove, LeRoy, Link Belt Company.
 Hanna, John, Hanna Engineering Company.
 Hitchcock, Frank, Aermotor Company.
 Hyde, Roy, Goodman Manufacturing Company.
 Kelsey, Russell, Union Special Machine Company.
 Lindeman, Arthur, Sullivan Machinery Company.

MacDougall, Robert, Allis-Chalmers Company.
 Meyer, Carl, Union Special Machine Company.
 Moe, Sverre, Latham Machinery Company.
 Mooney, John, Latham Machinery Company.
 Nilson, Arthur, Weller Manufacturing Company.
 Razab, William, Link Belt Company.
 Schroeder, Fred, Aermotor Company.
 Schubert, George, Goodman Manufacturing Company.
 Testal, Harvey, Aermotor Company.
 Valdes, Laurence, Woods Motor Vehicle Company.
 Whitsell, Floyd, E. Goldman Manufacturing Company.

Unclassified Academy Students

Boys

Barth, Karl William
 Brock, Herbert Alfred
 Brook, John
 Bruzand, Paul
 Burlin, Leslie
 Burns, Arthur Patrick, Jr.
 Butler, Edgar Oliver
 Carolan, Penn Nixon
 Chan, Fung Chee
 Clark, Walter Fred
Constant, Epoulos Stavros

Cooper, Joseph Fenimore
 Curtis, Edgar Alfred
 Davidson, Arthur Edwin
 Davis, William Rochester
 Dierks, Louie Elmer
 Dunas, Arthur Cassel
 Egan, Patrick
 Ertrachter, Leo
 Faust, Clyde Ambrose
 Field, Oliver Eugene
 Flood, Albert Lincoln

Flood, Harry John
 Gallagher, Patrick
 Garrison, John Lee
 Gilyeat, Wilbur A.
 Glaser, Albert Jacob
 Heywood, Vincent Eaton
 Hills, William B.
 Hirsch, Hugo
 Hokin, Harry Reginald
 Horrobin, William Taylor
 Ingalls, Robert Edmund
 Jaicks, Willson Askew
 Jeffris, Donald Hanchett
 Johnson, Archer
 Johnson, John Harry
 Juergens, Edwin William
 Kalvelage, Joseph Robert
 Kelly, John
 Kinney, Arthur Raymond
 Knowe, Harold Raymond
 Kolkow, Frank Theodore
 Konczyk, John
 Koppa, Walter George
 Kuck, Stanley Albert
 Kuehl, Adolph
 Lange, Hugo Frederick
 Litway, Andrew
 Magnuson, Albert Carl
 Mason, Fred C.
 Massey, Floyd John

McCarthy, Chester John
 McDonnell, Frank
 Neff, Edward Lehman
 Otley, Walter Adolph
 Padden, William Eugene
 Paehlig, Feodore Henry
 Pallma, Frank, Jr.
 Peters, Walter
 Polheart, James Leo
 Randall, Norman Brown
 Riordan, Robert Joseph
 Roepenack, Harry Charles
 Schulz, Karl
 Shapiro, Hyman
 Shipley, James Loraine
 Shonka, Robert Ralph
 Strnad, George
 Sundheim, George
 Swoed, Theodore
 Thomas, Morton Stanley
 Ury, Israel
 Vasold, Leo Louis
 Waldie, George Strange
 Whipple, John Grant
 Whitehead, Eugene Earl
 Yee, Paul John
 Young, George Bright, Jr.
 Zackarias, Michael
 Zierau, Niels

Girls.

Bernstein, Mildred
 Betz, Anna
 Busse, Clara
 Close, Helen Lorinda
 Coffin, Ruth Adele
 Cota, Mrs. Muriel Powell
 DeLaby, Jessie
 Denges, Ethel Helen
 Eggert, Louise
 Elliott, Estella
 Ex, Elsie Lillian
 Farrell, Fern Grace
 Feretti, Gertrude Martha
 Gazzolo, Helen Edith
 Gilbert, Marilla Phipps
 Heitter, Florence
 Holmberg, Carrie M.
 Huber, Adeline
 Johnson, Anna
 Kammann, Tillie
 Kandlik, Lillian
 Kegel, Emma
 Kendall, Margaret Pauline
 Lee, Sophia Miriam

Lerch, Helen Adele
 MacNaughton, Emma
 Miller, Mrs. Eulah E.
 Miller, Frances Helen
 Miller, Pearl
 Murphy, Mrs. Helen F.
 O'Connell, Ethel Marie
 Parks, Dora Ruth
 Parmenter, Blanche Minette
 Patton, Edith Alice
 Peck, Violet Sparling
 Ray, Sadie Seaman
 Roubik, Mrs. Lillian
 Sale, Marjorie Deakin
 Schuster, Edna Helen
 Schwartz, Helen Marie
 Seely, C. Elizabeth
 Smiley, Hazel
 Smith, Hazel
 Suffrin, Goldie
 Sweet, Ramona Cora
 Taylor, Florence Hale
 Thalsen, Elva Viola
 Tomlinson, Mrs. Gladys M.

Summary of Attendance, 1909-10

Students in Day Classes.....	1345
College Students.....	306
Engineering Students (Men).....	102
Science and Arts Students.....	156
Men.....	26
Women.....	130
Unclassified Students.....	48
Men.....	21
Women.....	27
Academy Students.....	822
Classified.....	692
Boys.....	480
Girls.....	212
Unclassified.....	129
Boys.....	81
Girls.....	48
Summer Students (not counted above).....	218
Boys.....	109
Girls.....	109
Students in Evening Classes.....	1697
Engineering Students (Men).....	501
Mechanic Arts.....	428
Men.....	422
Women.....	6
Mathematics.....	262
Men.....	248
Women.....	14
English.....	193
Men.....	128
Women.....	65
Domestic Economy.....	282
Cooking (Women).....	174
Sewing (Women).....	108
Chemistry.....	63
Men.....	57
Women.....	6
Latin.....	8
Men.....	5
Women.....	3
German.....	11
Men.....	9
Women.....	2
Pottery.....	38
Men.....	6
Women.....	32
Physical Culture (Women).....	53
Total Evening Students.....	1839
Deduct Students Counued Twice.....	142
Total Day and Evening Students.....	3042

University Extension Lectures.

The University Lecture Association announces the following lectures at Lewis Institute:

RECENT ENGLISH DRAMATISTS. By Professor William D. MacClintock, A.M., of the University of Chicago.

September 29.—The Dramas of Bernard Shaw: Analysis of "Candida."

October 6.—The Plays of Arthur Pinero: Analysis of "The Second Mrs. Tanqueray."

October 13.—The Plays of Henry Arthur Jones: Analysis of "The Liars."

*October 19.—The Dramas of Stephen Phillips; Study of "Paola and Francesca."

October 27.—The Dramas of William Butler Yeats; Study of "The Land of Heart's Desire" and "The Countess Kathleen."

November 3.—The Plays of John Galsworthy: Study of "Strife."

A popular account of the work of Shaw, Pinero, Jones, Barrie, Phillips, Yeats, Wilde, Galsworthy, with incidental mention of others. There will be, each evening, an analysis and criticism of at least one important play of one of these authors. Only such playwrights and plays will be studied as may fairly be said to be literary as well as dramatic. Attempt will be made to state the present influence of the drama of Ibsen and the meaning of the revival of poetic drama.

VENICE AND HER SISTER CITIES. By Professor Charles Upson Clark, Ph.D., Yale University.

November 10.—Queens of the Adriatic; the Dawn of Venice.

November 17.—Among the Lagoons; St. Mark's and the Grand Canal.

November 24.—The Painters of Venice.

December 1.—Padua: A Venice on Terra Firma.

December 8.—Verona: Epitome of Italian Charm.

December 15.—Here and There in the Veneto; Ravenna.

A study of Venice and her sister cities, with special regard to Venetian history and art. The lectures trace the dramatic evolution of the lagoon settlement of the refugees from the Huns and Franks into the proud city, well-named Queen of the Adriatic and Mistress of the Mediterranean; her absorption of the older cities of the mainland—Padua, Verona, etc.—with sketches of their history and art treasures; and her gradual decline. Numerous slides from snapshots give a vivid idea of the life of today in these cities.

This course will be fully illustrated with stereopticon views.

CONTEMPORARY DRAMA. Six interpretative recitals by Professor S. H. Clark.

January 5—February 9.

Full announcement will be made later.

STUDIES IN DRAMATIC LITERATURE. By Professor J. G. Carter Troop, A.M., of the University of Chicago.

February 16.—Miracle Plays and Mysteries—The Biblical Narrative Dramatized.

February 23.—Moralties and Interludes—"Every-Man," "Wit and Science," and "The Four P's."

March 2.—Influences Which Formed the Elizabethan Drama—Classical, Italian, and Native

March 9.—Shakspeare's Immediate Predecessors—Marlowe, Lyly, Greene, and others.

March 16.—Story and Character in Shakspeare's Plays—The Situation and Its Inspiration.

March 23.—The Later Elizabethan Drama—Ben Jonson, Beaumont and Fletcher, and others.

University Extension Lectures.

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OCTOBER, 1911

THE NEW
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Lewis Institute Bulletin

REGISTER OF 1910-1911 AND
ANNOUNCEMENTS FOR 1911-1912

CHICAGO

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THE BULLETIN

CONCERNING THE FOLLOWING SUBJECTS

REPORT OF THE COMMISSIONER OF THE BUREAU OF LANDS
AND FORESTS, IN HIS ANNUAL REPORT TO THE SENATE AND
HOUSE OF REPRESENTATIVES, FOR THE YEAR 1890
AND THE FOLLOWING, WHICH HAVE BEEN
APPROVED BY THE COMMISSIONER OF THE BUREAU OF LANDS
AND FORESTS.

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LEWIS INSTITUTE BULLETIN



CHICAGO, OCTOBER, 1911

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CALENDAR

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Institute Calendar—1911-1912

1911—

- Sept. 4-16, Monday to Saturday—Registration of incoming students.
- Sept. 18, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.
- Sept. 25, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1910-1911.
- Oct. 2-6, Monday to Friday, Evenings—Registration and Classification of candidates for Admission to Evening Classes.
- Oct. 9, Monday—Evening Classes begin.
- Nov. 30, Dec. 1, Thursday and Friday—Thanksgiving Recess.
- Dec. 15, Friday—Autumn Quarter ends.

HOLIDAY RECESS FOR TWO WEEKS.

1912—

- Jan. 2, Tuesday—Winter Quarter begins.
- Feb. 22, Thursday—Washington's Birthday—A Holiday.
- March 22, Friday—Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK.

- April 1, Monday—Spring Quarter begins.
- May 16, Thursday—Evening Classes end.
- June 21, Friday—Spring Quarter ends.
- July 1, Monday—Summer Session begins.
- July 4, Thursday—A Holiday.
- Aug. 9, Friday—Summer Session ends.
- Sept. 2-14, Monday to Saturday—Registration of incoming students.
- Sept. 16, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.
- Sept. 23, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1911-1912.
- Sept. 30-Oct. 5, Monday to Saturday, Evenings—Registration and Classification of Candidates for Admission to Evening Classes.
- Oct. 7, Monday—Evening Classes begin.
- Nov. 28-29, Thursday and Friday—Thanksgiving Recess.
- Dec. 20, Friday—Autumn Quarter ends.

CORPORATION

OFFICERS

CHRISTIAN CECIL KOHLSAAT

President

THOMAS KANE

Vice-President

JOHN McLAREN

Secretary and Treasurer

TRUSTEES

BERNARD ALBERT ECKHART

OLIVER HARVEY HORTON

THOMAS KANE

CHRISTIAN CECIL KOHLSAAT

JOHN McLAREN

BOARD OF MANAGERS

BION JOSEPH ARNOLD

GEORGE NOBLE CARMAN

BERNARD ALBERT ECKHART

JAMES BRYAN HERRICK

OLIVER HARVEY HORTON

EDMUND JAMES JAMES

HARRY PRATT JUDSON

THOMAS KANE

CHRISTIAN CECIL KOHLSAAT

JOHN McLAREN

ADDISON ELDRED WELLS

GEORGE NOBLE CARMAN, Director

WILLIAM HERBERT HALL, Business Manager

Officers of Administration and Instruction

ADMINISTRATIVE OFFICERS

GEORGE NOBLE CARMAN, A. M.
Director

EDWIN HERBERT LEWIS, Ph. D.
Dean of College Students

PHILIP BELL WOODWORTH, B. S., M. E.
Dean of Evening School

ALEXANDER WILLETT MOSELEY, S. B.
Head of Department of Engineering

HELEN DOUGAL STREET, A. M.
Dean of Women Students

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Registrar and Dean of Summer School

OFFICERS OF INSTRUCTION IN DAY SESSION

(The names in each group appear in the order of appointment to the group.)

EDWIN HERBERT LEWIS, Ph. D.
Professor of English

PHILIP BELL WOODWORTH, B. S., M. E.
Professor of Physics

CLARENCE ELBERT DEPUY, B. S.
Professor of Machine Construction

ALEXANDER WILLETT MOSELEY, S. B.
Professor of Mechanics

WARREN RUFUS SMITH, Ph. D.
Professor of Chemistry

HERBERT EDGAR COBB, A. M.
Professor of Mathematics

FRED A. ROGERS, B. S.
Professor of Physics and Electrical Engineering

JESSIE LOUISE JONES, Ph. D.
Professor of German

GEORGE LEE TENNEY, A. M.

Professor of Latin

CHARLES EMMERSON PEET, B. S.

Professor of Physiography

JOHN DEBK NIES, B. S.

Professor of Electrical Engineering

DUANE STUDLEY, B. S.

Assistant Professor of Mathematics

PHILEMON BULKLEY KOHLISAAT, Ph. B.

Assistant Professor of English

BERKELEY JOHN THOMAS, A. M.

Assistant Professor of Mathematics

HELEN DOUGAL STREET, A. M.

Assistant Professor of Ancient History

DIC HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry

JESSE MYRON OWEN, Ph. B.

Assistant Professor of English

MILO MILTON QUARF, Ph. D.

Assistant Professor of History

WILLIAM PARKER HAWLEY, B. S.

Assistant Professor in charge of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.,

Assistant Professor of Mechanics

FRED LEWIS TURNER, A. M.

Assistant Professor of Latin

LEA RACHEL DELAGNEAU

Assistant Professor of French

KATHERINE ISABEL INGERSOLL

Assistant Professor in charge of Domestic Art

MINNA CAROLINE DENTON, A. M.

Assistant Professor of Physiology and Bacteriology

MABEL THACHER WELLMAN, A. B.

Assistant Professor in charge of Domestic Science

JUDSON FISKE LEE, A. M.

Assistant Professor of History and Economics

LOUIS EDWARD POPE

Instructor in Mathematics

MARIE ELSA BLANKE

Instructor in Freehand Drawing

GEORGE ALEXANDER ROSS

Instructor in Woodwork

OFFICERS OF INSTRUCTION

CHARLES EDGAR HOYT

Instructor in Foundry Work in charge of Shop Apprentices

JULIA DUMKE PEET, Ph. B.

Instructor in German

***EDWARD HERMAN LAY, A. B.**

Instructor in Mathematics

KATE BELLE MILLER, Ph. B.

Instructor in English

HORACE BERNARD MCCABE

Instructor in Machine Shop Work

EDWARD LESTER WHEELER

Instructor in Physical Culture

ALPHONSO WIETH CAVANAUGH

Instructor in Mathematics

ANNA ELIZABETH DRUMMOND, A. B.

Instructor in English

HELMUT BERENS, A. B.

Instructor in German

FREDERICK LESTER HAVENS, M. E.

Instructor in Forge and Machine Shop Work

GEORGE FREDERICK CASSELL, A. B.

Instructor in German

GRACE EMERSON MOORE

Instructor in Domestic Science

VICTOR LOUIS SHERMAN

Instructor in Mechanical Drawing

JULIA GRACE MERRILL

Instructor in Cooking

LOIS MARTIN

Instructor in Sewing and Textiles

GRACE LUCILE HENNECKE

Instructor in Millinery and Sewing

JACOB M. KINNEY, A. M.

Instructor in Mathematics

HELEN F. PAGE

Instructor in English

JOHN HENRY SMALE, A. B.

Instructor in English

*Died December 21, 1910

ROBERT FREDERICK BIESEMEIER

Instructor in Machine Shop Work

***GRACE GORDON HOOD**

Instructor in Cooking

FRANK HARRISON WADE, M. E.

Instructor in Physics

JUDSON THOMAS WEBB

Instructor in Pottery

EDWIN D. LEMAN

Instructor in Chemistry

ADOLPH C. FENSHOLT

Instructor in Physics

FRANCES TALCOTT

Librarian

LAURA M. WINKLEMAN

Instructor in Millinery and Sewing

PORTIA CARNES, Ph. B.

Instructor in English and Dramatics

CHARLES J. CLARK

Instructor in Foundry

ETHEL J. POND

Instructor in Sewing

SARAH EDITH COLE

Instructor in Sewing

BERTHA LOUISE NIXSON

Instructor in Cooking

HENSON H. THOMAS, B. S.

Instructor in Chemistry

FERN E. BOLL, B. S.

Instructor in Domestic Science

EDWARD MARIS HARVEY, A. B.

Assistant in Plant Physiology

CLARA RONSHAUSEN

Assistant in Bacteriology

RHODA EDEY HARVEY

Assistant in Physical Culture

GRACE MCMAHON, B. L. S.

Assistant Librarian

CAROLINE WILKIE KOHLSAAT

Conductor of Orchestra

KATHARINE HOWARD WARD

Assistant in Music

ELIZABETH AGNES CADIGAN

Clerk and Telephone Attendant

***Resigned**

General Information

Scope of Work

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in three main divisions, viz.: Engineering and Mechanic Arts; Domestic Economy; the Liberal Arts. For four years of college work the Institute grants to men the degree of Bachelor of Science in Mechanical Engineering, and to women the degree of Bachelor of Science in Domestic Economy. The title of Associate is given for the work of two years of college grade, and the Academy Certificate for the work of four years of secondary grade.

The Sessions

The Day Session opens the third Monday in September and continues until the third Friday in June, and is divided into three quarters of twelve weeks each by a holiday recess of two weeks and a spring recess of one week. The Autumn Quarter is preceded by a preliminary week for students not before in attendance. The Day Session begins at 8:40 a. m. and lasts until 5 p. m. Hours are arranged as far as possible to suit the convenience of students.

For shop apprentices the session opens the last Monday in September and continues until the last Friday in August, so that each apprentice has 22 weeks in school, 26 weeks in shop and 4 weeks vacation.

The Evening Session opens the first Monday in October and continues until the third Thursday in May. The opening week is set apart for the registration and classification of candidates for admission. There are three terms of ten weeks each; one before, and two after, the holidays. The Evening Session begins at 4 p. m. and lasts until 10 p. m. Most of the classes meet from 7:30 to 9:30, for two evenings a week; Monday and Wednesday, or Tuesday and Thursday.

The Summer Session opens the first Monday in July and continues for six weeks. The hours are from 8 a. m. to 4 p. m., but most of the instruction is given in the forenoon.

Requirements for Admission to Day Classes

Applicants are admitted to the Institute as *academy* students if they have had a grammar school education or its equivalent. Applicants are admitted as *college* students upon satisfactory evidence of the completion of a four year high school or academy course, consisting of at least fifteen units, which must include three units of English, one unit of Elementary Algebra, and one unit of Plane Geometry. On the basis of their previous schooling both college and academy students are assigned to classes. This assignment, however, is regarded as probationary until confirmed by examination. The examination is held during the preliminary week of each school year, and takes the form of recitations, oral and written, which determine the applicant's fitness to continue in the classes to which he has been assigned.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Assignment of Studies

On entering the Institute a student is assigned to such studies as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Units" and "Courses of Instruction"

A unit consists regularly of three academy courses (a year's work) in any given subject.

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

Bachelor of Science in Mechanical Engineering

To be enrolled as a candidate for the degree of Bachelor of Science in Mechanical Engineering, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 21-40.

Courses	Units.
English, 1-9	3
Mathematics, 1-6, 10-12	3
German, A-F	2
Science, or additional foreign language.....	2
History, 4-6	1
Physics, 1-3	1
Drawing, Mechanic Arts, 1, 5, 6.....	1
Shopwork, Mechanic Arts, 2, 3, 4, 7, 19, 20.....	2

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Bachelor of Science in Mechanical Engineering. The requirements are shown in detail in the curriculum (see page 15).

The Degree of Bachelor of Science and the Title of Associate in Domestic Economy

To be enrolled as a candidate for the degree of Bachelor of Science or for the title of Associate in Domestic Economy, a student must have credit for fifteen admission units, three of which shall be in English and two in Mathematics, or she must have collegiate standing equivalent to the admission units in which she is deficient.

Two years of college work are required for the title of Associate, and four years for the degree of Bachelor of Science. The requirements are shown on page 16 in the college curriculum. The work of the second year may be so modified by candidates for the title as to put the emphasis on either cooking or sewing. The additional requirements for the degree are an extra year in domestic economy, in which the student may specialize in either domestic science or domestic art, and also a year of college electives in the liberal arts.

On page 16 is a suggested academy curriculum preparatory to the college curriculum in domestic economy. Modifications of this curriculum are permissible, but in order to enable a student to complete in two years the courses prescribed for the title of Associate there should be one admission unit in either physics, chemistry, or cooking, and also a unit in sewing or an equivalent practical knowledge. Opportunities for meeting the requirements in these subjects are furnished by means of the Summer School and by Saturday morning classes during the school year.

The Title of Associate in Arts

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

The Academy Certificate

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and opportunities.

**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM LEADING TO
DEGREE OF B. S. IN MECHANICAL ENGINEERING***

FIRST YEAR											
AUTUMN QUARTER			WINTER QUARTER			SPRING QUARTER					
	Course	Hours		Course	Hours		Course	Hours		Course	Hours
English.....	1	5	English.....	2	5	English.....	2	5			
Algebra..... A W	1	5	Algebra..... W S	2	5	Algebra..... A S	2	5			
Machine Sketching E	1	10	Wood Shop..... E	2	10	Instrum'l Drawing E	2	10			
Physiography.....	1	10	Physiography.....	2	10	Physiography.....	3	10			
SECOND YEAR											
English.....	4	5	English.....	5	5	English.....	6	5			
Plane Geometry A W	4	5	Plane Geometry.. WS	5	5	Plane Geometry.. A S	6	5			
Projection Draw'g E	6	10	Forge Shop..... E	3	10	Foundry..... E	4	10			
German..... A	5		German..... B	5		German..... C	5				
THIRD YEAR											
American History... 4	5		American History... 5	5		American History... 6	5				
Physics..... 1	10		Physics..... 2	10		Physics..... 3	10				
Machine Shop..... E	19	10	Machine Shop..... E	20	10	Pattern Shop..... E	7	10			
German..... D	5		German..... E	5		German..... F	5				
FOURTH YEAR											
English..... A W	7	5	English..... E	8	5	English..... 9	5				
Algebra..... A W	10	5	Algebra..... WS	11	5	Solid Geometry..... 12	5				
Pattern Shop..... 8	10		Machine Shop..... E	22	10	Machine Shop..... E	22	10			
German..... G	5		German..... H	5		German..... I	5				

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF B. S. IN MECHANICAL ENGINEERING**

FIRST YEAR											
English..... A	5		English..... B	5		English..... C	5				
Algebra..... A W	13	5	Trigonometry... WS	14	5	Analyt'l Geometry... 15	5				
Chemistry..... 1	10		Chemistry..... 2	10		Chemistry..... 3	10				
Machine Draw'g... E	10	10	Machine Sketching 11	10		Surveying..... 13	10				
SECOND YEAR											
Economics..... 10	5		Economics..... 11	5		Economics..... 12	7				
Calculus..... 16	5		Calculus..... 17	5		Calculus..... 18	5				
Physics..... 4	15		Physics..... 5	15		Physics..... 6	15				
Kinematics..... 28	5		Machines..... 15	8		Descriptive Geomet'y 25	7				
THIRD YEAR											
Mechanics..... 16	5		Mechanics..... 17	5		Mechanics..... 18	5				
Thermodynamics... 43	5		Machine Shop..... 23	9		Valve Gears..... 31	6				
Electrical Laborat'y 35	10		Electrical Laborat'y 36	10		Electrical Laborat'y 37	10				
Machine Draw'g.. A S	12	10	Foundry..... 9	6		Mach. Tool Anal. 24	9				
FOURTH YEAR											
Hydraulics..... 42	5		Direct Current Mach. 38	5		Induction, Motors, etc 39	5				
Chemistry..... 4	10		Chemistry..... 6	10		Chemistry..... 12	10				
Machine Design..... 32	10		Struct'l Steel Work... 33	10		Power Plants..... 49	15				
Materials of Const. 46	5		Specifications..... 50	2							

* When a Course is given in more than one quarter, the quarter is indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring. *Light face* type indicates elective courses. **Heavy face** type indicates required courses.

**SUGGESTED ACADEMY CURRICULUM PREPARATORY TO
FOUR-YEAR COLLEGE CURRICULUM LEADING TO
DEGREE OF B. S. IN DOMESTIC ECONOMY**

FIRST YEAR

AUTUMN QUARTER		WINTER QUARTER		SPRING QUARTER	
Course	Hours	Course	Hours	Course	Hours
English.....	1 5	English.....	2 5	English.....	3 5
Algebra..... A W	1 5	Algebra..... W S	2 5	Algebra..... A S	3 5
Latin 1 or German...	A 5	Latin 2 or German...	B 5	Latin 3 or German...	C 5
Drawing.....	1 10	Drawing.....	2 10	Drawing.....	3 10

SECOND YEAR

English.....	4 5	English.....	5 5	English.....	6 5
Accounting.....	7 5	Accounting.....	8 5	Accounting.....	9 5
Latin 4 or German...	D 5	Latin 5 or German...	E 5	Latin 6 or German...	F 5
Sewing.....	A 10	Sewing.....	B 10	Sewing.....	C 10

THIRD YEAR

Plane Geometry AW	4 5	Plane Geometry WS	5 5	Plane Geometry..A S	6 5
Ancient History.....	1 5	Ancient History.....	2 5	Ancient History.....	3 5
Latin 7 or German...	G 5	Latin 8 or German...	H 5	Latin 9 or German...	I 5
Hygiene.....	E 3	Cooking..... AW	1 10	Cooking..... WS	2 10

FOURTH YEAR

English.....	7 5	English.....	8 5	English.....	9 5
American History....	4 5	American History....	5 5	American History....	6 5
Latin 10 or French...	1 5	Latin 11 or French...	2 5	Latin 12 or French...	3 5
Physics.....	1 10	Physics.....	2 10	Physics.....	3 10

**FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE
OF B. S. IN DOMESTIC ECONOMY**

FIRST YEAR

Chemistry.....	1 10	Chemistry.....	2 10	Chemistry.....	3 10
Cooking..... A W	4 10	Cooking..... W S	5 10	Plant Physiology.....	1 8
Sewing and Design...	D 10	Sewing and Design...	E 10	Sewing and Design...	F 10
English.....	10 2	English.....	10 2	English.....	10 2

SECOND YEAR

Physiology..... A W	2 10	Bacteriology A W	3 10	Sanitation.....	10 5
Food and Dietetics...	7 10	Food and Dietetics...	8 10	Cooking.....	6 10
Millinery and Sewing	G 10	Sewing and Laundry	H 10	Sewing and Textiles.	I 10
The Household.....	9 2	The Household.....	9 1	The Household.....	9 2

THIRD YEAR

Dressmaking.....	J 10	Textiles.....	K 5	Textiles.....	L 10
Cooking.....	11 10	Cooking.....	12 10	Applied Design.....	M 10
English.....	13 5	Home Management...	13 5	Teaching Dom. Sc....	14 5
Economics.....	10 5	Psychology.....	1 5	Philosophy.....	2 5

FOURTH YEAR

Special Problems....	15	Special Problems....	15	Special Problems....	15
Electives.....		Electives.....		Electives.....	

COLLEGE COURSES LEADING TO TITLE OF ASSOCIATE IN ARTS

FIRST YEAR

AUTUMN QUARTER		WINTER QUARTER		SPRING QUARTER	
Course	Hours	Course	Hours	Course	Hours
English.....	10 5	English.....	11 5	English.....	12 5
European History.....	7 5	European History.....	8 5	European History.....	9 5
Mathematics.....	13 5	Mathematics.....	14 5	Mathematics.....	15 5
Chemistry.....	1 10	Chemistry.....	2 10	Chemistry.....	3 10
Latin.....	13 5	Latin.....	14 5	Latin.....	15 5
German.....	1	German.....	2 5	German.....	3 5
French.....	1	French.....	2 5	French.....	3 5
Greek.....	1 5	Greek.....	2 5	Greek.....	3 5

SECOND YEAR

English.....	13 5	English.....	14 5	Philosophy.....	1 5
History.....	13 5	History.....	14 5	History.....	15 5
Economics.....	10 5	Economics.....	11 5	Economics.....	12 5
Mathematics.....	16 5	Mathematics.....	17 5	Mathematics.....	18 5
Physics.....	4 15	Physics.....	5 15	Physics.....	6 15
Chemistry.....	4 10	Chemistry.....	6 10	Chemistry.....	7 10
Latin.....	16 5	Latin.....	17 5	Latin.....	18 5
German.....	4 5	German.....	5 5	German.....	6 5
French.....	4 5	French.....	5 5	French.....	6 5
Greek.....	4 5	Greek.....	5 5	Greek.....	6 5

The Co-operative Course for Shop Apprentices

In January, 1909, a plan of co-operation in the training of shop apprentices was inaugurated by the Institute and certain manufacturers in Chicago. The Apprentices are sent to the Institute half the time, alternating one week in the shop and the next week in school.

It is not the idea of either the manufacturers or the Institute that a boy can become a skilled workman in two years, but that work in the shop combined with instruction in the school gives him a more intelligent idea of his trade than he can otherwise obtain.

Boys between sixteen and twenty-one years of age are eligible to admission. No formal examination is required of applicants, but the candidate must satisfy the employer that he is capable of doing the work required in the shop and must satisfy the Institute that he is prepared to profit by the instruction that will be given.

SCHOOL SCHEDULE FOR SHOP APPRENTICES

FIRST YEAR			
HOURS	AUTUMN QUARTER	WINTER QUARTER	SPRING QUARTER
8:40 to 10:30	Engn'ring Principles.	Engn'ring Principles.	Engn'ring Principles.
10:40 to 11:30	Shop Mathematics....	Shop Mathematics....	Shop Mathematics....
11:40 to 12:30	English.....	English.....	English.....
1:10 to 3:00	Machine Sketching..	Machine Sketching..	Machine Sketching..
3:10 to 5:00	Machine Shop.....	Machine Shop.....	Foundry.....
SUMMER	8:10 to 10:00	Engineering Principles. Applied Mathematics. Chem. Demonstration Lectures Engineering Principles.	
	10:10 to 11:00		
	11:10 to 12:00		
	1:10 to 4:00		
SECOND YEAR			
HOURS	AUTUMN QUARTER	WINTER QUARTER	SPRING QUARTER
8:40 to 10:30	Steam Laboratory....	Mechanics.....	Shop Organization....
10:40 to 11:30	Applied Mathematics	Applied Mathematics	Applied Mathematics
11:40 to 12:30	English.....	English.....	English.....
1:10 to 3:00	Mechanical Drawing.	Machine Drawing....	Gearing and Cams....
3:10 to 5:00	Pattern Shop.....	Forge Shop.....	Machine Shop.....

Half-Day, Evening, and Summer Courses

As a rule students in the day classes are expected to make their work systematic by aiming definitely toward the degree, the title, or the certificate. It is recognized, however, that many students are obliged to leave school in order to take care of themselves and those dependent upon them, at a time when their more fortunate associates enter upon such courses of instruction as are herein outlined. To such students the Institute offers opportunities for special instruction in accordance with their needs, particularly in the line of shopwork, mechanical drawing, and domestic economy. Such as can attend the Institute but half of each day may, by prolonging the time requirement, complete the work of some one group of studies, or at least make advancement in one or more subjects.

Provision has also been made for such evening instruction as will enable young men and women who are employed during the day to continue their education along those lines which will be of the most service to them in the work in which they are engaged. In point of number of students and benefits derived by them no work of the Institute is more important.

The summer courses are designed for students who wish to shorten the time necessary for completing the work required for graduation, to make up deficiencies in scholarship, or to pursue special courses in the shops or laboratories. Any course of instruction offered by the Institute will be repeated during the summer, if the demand is such as to justify the formation of a class.

Tuition and Fees

Day students are required to pay a registration fee of five dollars. This fee is due at the time of registration. The rate of tuition for day students is twenty dollars a quarter. Where a student limits himself to one course of instruction, with five hours of class work each week, there is a reduction of ten dollars a quarter. In laboratory, drawing, and shopwork, ten hours, or a fraction thereof, count as five in determining the charge.

The rate for evening students is five dollars for a term of ten weeks for one course of instruction, two evenings a week, and ten dollars for two courses, four evenings a week.

The tuition for the summer term for each course of five hours a week of class instruction is five dollars. Students who attend only in the summer are not required to pay the registration fee.

Both day and evening students who take one or more shop or laboratory courses in the departments of physics, chemistry, mechanic arts, engineering, and cookery are required to pay a shop or laboratory fee of five dollars a quarter or term.

Students in chemistry deposit five dollars to cover breakage. If the charges do not amount to five dollars, the excess is returned to the student.

All payments are due in advance, on the first day of the quarter. Checks and money orders should be made payable to Lewis Institute.

Scholarships

Three scholarships, each amounting to one year's tuition, have been established under the will of the late Mrs. Hugh A. White.

One scholarship amounting to one year's tuition has been established by Mr. Bernard A. Eckhart.

The tuition of the boys in the Co-operative Course for Shop Apprentices who do satisfactory work in both the shop and the school is paid by Mr. La Verne W. Noyes.

Standings and Reports

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction

NOTE.—The Courses of Instruction offered are tabulated on pages 15-17 and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20, 22; Mathematics, 1-12; Physics, 1-3; Physiography, 1-3; Domestic Economy, A-C, 1-3; History, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-11, 21, 23; Engineering, 12-50; Mathematics, 13-18; Physics, 4-6; Chemistry, 1-12; Geology, 4; Physiology and Bacteriology, 1, 2, 3; Philosophy, 1, 2; Domestic Economy, D-M, 4-15; History and Economics, 7-15; English, 10-15, A-C; German, 1-9; French, 1-9; Latin, 13-18; Greek, 1-6.

Mechanic Arts

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who plan to follow mechanical and electrical engineering. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. **MACHINE SKETCHING.** Constructive work in perspective. Dimensioned sketches of machine parts.

2. **WOOD WORK.** A fundamental course in bench work and wood turning preparatory to pattern work and to the arts and crafts. Special emphasis is given to the care and use of tools and to the study of different woods and their characteristics.

2a. **WOOD WORK.** For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. **WOOD WORK.** A Continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes, and finishes. Practice with woodworking machinery.

3. **FORGE WORK.** Simple forging. Hardening and tempering. Work with steam hammer.

4. **FOUNDRY WORK.** Study of modern foundry construction, equipment, materials and methods. Practice in molding, coremaking, melting, and pouring.

5. **INSTRUMENTAL DRAWING.** The first work with drawing instruments. Lettering and conventional representation of threads, bolts and nuts, and fastenings. Construction of mathematical curves. Designed to establish standard methods.

6. **PROJECTION DRAWING.** Planes of projection; intersections, including conic sections; revolution of views and development of surfaces. Making of detail and assembly drawings of simple machines and parts; tracing.

7. **PATTERN MAKING.** Practice in making simple patterns. Use of general woodworking machines. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

8. **PATTERN MAKING.** A continuation of Course 7.

9. **ADVANCED FOUNDRY WORK.** Problems introduced by heavy castings, production, and molding machines; foundry equipment and arrangement; correlation of work of foundry with that of pattern shop, machine shop, and drafting room.

10. **MACHINE DRAWING.** Making of detail drawings and assembly drawings of machines; tracing.

10a. **MACHINE DRAWING.** A continuation of Course 10. Mechanical drawing and tracing.

11. **ADVANCED MACHINE SKETCHING.** Making of perspective sketches from mechanical drawings and empirical formulas. Intended to develop the student's sense of proportion and to acquaint him with the mechanism and details of certain machines.

19. **BENCH METAL WORK.** Description of the materials commonly used in machine work and the tools employed in bench and floor work; practice in chipping, filing, laying-out, and other processes.

20. **MACHINE TOOL WORK.** Description of the construction and operation of the engine lathe, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

21. **FORGE WORK.** Jig, steam hammer, and special work. Shop methods, cost estimating, forge shop equipment.

22. **MACHINE TOOL WORK.** (One or more quarters.) Practice with machine tools, hand tools, standard gauges, and measuring instruments in making, finishing, and assembling machines and machine parts, taps, dies, reamers, milling cutters, punching and drawing dies.

23. **GEAR AND CAM CONSTRUCTION.** Practice with machine tools and instruments in the application of the principles of mechanism to the construction of spur, bevel, and spiral gears, racks, and cams. *Prerequisite: Engineering 12 and 23.*

Engineering

The courses grouped in this division are open to college students and include applied mathematics, applied electricity, testing of machinery and materials, and machine design. These courses, in conjunction with the college mathematics, chemistry, physics, mechanic arts, English, history, and economics, lead up to the degree of Bachelor of Science in Mechanical Engineering. The studies are so arranged, however, that those students in engineering who do not expect to receive the degree may derive much benefit by closely following the regular arrangement of studies during the time that they are able to remain at the Institute.

12. **ADVANCED MACHINE DRAWING.** Gearing; involute and cycloidal. Bevel and screw gears. Problems in various types of cams. Problem in arrangement of piping. Tracing. Prerequisite: *Engineering 28.*

13. **SURVEYING.** Measurement of distances by pacing, chain, and tape. Practice in the use of compass, transit, and level in land and city surveying, leveling, and the running of simple railway curves. Study of the construction, testing, and adjustment of instruments. Field records and office copies. Prerequisite: *Mechanic Arts 1 and 6; Mathematics 14.*

15. **MACHINES.** Principles of the steam engine, steam boiler, pump, and other machines and appliances. The work is elementary in character and is intended to acquaint the student with the details and use of the machines studied, both as a preparation for the courses in valve gears and thermodynamics and as a practical training for the shop and power plant. Prerequisite: *Course 28.*

16. **MECHANICS, STATICS.** Composition and equilibrium of concurrent and non-concurrent forces; suspended weight and catenary. Prerequisite: *Physics 4; Mathematics 15 and 18.*

17. **MECHANICS, KINETICS.** Rectilinear motion; virtual velocities; moment of inertia; dynamics of a rigid body; work, energy, and power; friction. Prerequisite: *Course 16.*

18. **MECHANICS, STRENGTH OF MATERIALS.** Elementary stresses and strains; flexure of beams; continuous girders; flexure of long columns; combined stresses. Prerequisite: *Course 17.*

24. **MACHINE TOOL ANALYSIS.** The study of existing machines and tools to determine the principles involved in their construction; examining and testing of machines and mechanisms for rigidity, accuracy, or efficiency. Prerequisite: *Course 12; Mechanic Arts 23.*

25. **DESCRIPTIVE GEOMETRY AND KINEMATIC DRAWING.** Graphical methods for the solution of problems in the intersections of lines and surfaces. Problems in Kinematics. Practical applications. Prerequisite: *Mechanic Arts 11; Mathematics 15.*

27. **MACHINE DESIGN.** Stresses in machine parts, especially under the conditions of motion. Prerequisite: *Course 32.*

28. **KINEMATICS.** A study of the laws of the communication of motion by mechanisms. Rolling and sliding contact, linkwork, belts and bands, aggregate combinations. Prerequisite: *Mechanic Arts 11; Mathematics 15.*

31. **VALVE GEARS.** The application of the principles of the courses in Machines (15), Kinematics (28), and Thermodynamics (43), to the study of various types of valves and valve gears. Prerequisite: *Courses 28 and 43.*

32. **MACHINE DESIGN.** The elements of steam-engine design. Study of the different types of boilers. Boiler design. Prerequisite: *Courses 18 and 31.*

33. **STRUCTURAL STEEL WORK.** The study of the stresses and details of the plate girder, roof truss, and simple pin-connected bridge. Current specifications. Shop visits. Prerequisite: *Course 46.*

35. **DIRECT CURRENT PRINCIPLES AND PRACTICE.** Magnetic and electric calculations for generators and motors; armature windings; characteristic curves; wiring; instruments. Prerequisite: *Physics 6; Mathematics 18.*

36. **ALTERNATING CURRENT PRINCIPLES.** Sine functions; vectors; reactance; condensance; impedance; series parallel circuits; transmission lines. Prerequisite: *Course 35.*

37. **ALTERNATING CURRENT MACHINERY.** Transformer; generator; induction motor; synchronous motor; rotary converter. Prerequisite: *Course 36.*

38. **DIRECT CURRENT MACHINERY.** Motor control systems. Armature reaction. Distortion of field flux. Harmonic analysis. Rotary converter wave form. Prerequisite: *Course 37.*

39. **INDUCTION MOTOR. FLUX DISTRIBUTION, etc. SYNCHRONOUS APPARATUS.** Prerequisite: *Course 38.*

42. **HYDRAULICS.** The mechanics of fluids at rest and in motion; flow of water through weirs, orifices, and pipes; pumps and motors; study of design of turbine. A brief consideration of water supply and drainage. Class room and laboratory. Prerequisite: *Course 17.*

43. **THERMODYNAMICS.** The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Course 15; Mathematics 18.*

44. **HEAT ENGINES.** A short course in the steam and gas engine laboratories. Prerequisite: *Course 43.*

46. **MATERIALS OF CONSTRUCTION.** The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Course 18.*

49. **POWER PLANTS.** Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses 43 and 44.*

50. **SPECIFICATIONS AND CONTRACTS.** A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. **ELEMENTARY ALGEBRA.** Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. **ELEMENTARY ALGEBRA**, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. **CONCRETE GEOMETRY**, one day a week.

3. **ELEMENTARY ALGEBRA**, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. **CONCRETE GEOMETRY**, one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. **PLANE GEOMETRY.** Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. **ACCOUNTING.** Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. **ACCOUNTING.** Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. **ACCOUNTING.** Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making

settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken this course will be able to devise a system answering the requirements of an ordinary business.

10. **ADVANCED ALGEBRA.** Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. **ADVANCED ALGEBRA.** Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. **SOLID GEOMETRY.** Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. **ALGEBRA.** Permutations and combinations, limits, convergence of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **ANALYTIC GEOMETRY.** The equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; co-ordinates in space; surfaces, curves, and equations; the use of graphic methods in solving practical problems.

16. **CALCULUS.** Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. **CALCULUS.** Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. **CALCULUS.** Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize students with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. **GENERAL PHYSICS. Mechanics:** A discussion and illustration of physical quantities and their measurement; simple types of motion; density; velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. **Heat:** Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. **LABORATORY PHYSICS.** Strictly quantitative, covering subjects named above.

2. **GENERAL PHYSICS. Electricity:** Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. **LABORATORY PHYSICS.** Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators.

3. **GENERAL PHYSICS. Sound:** Waves, sounds and their relations, sonorous bodies, compound tones, and musical instruments. **Light:** Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves; color; polarization. **LABORATORY PHYSICS.** Quantitative work in mechanics, heat, sound, electricity, and light, and calibration of instruments.

4. **MECHANICS.** Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics 14.*

5. **ELECTRICAL MEASUREMENTS.** Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients, calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics 14.*

6. **HEAT AND LIGHT.** Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics* 14.

Chemistry

The aim of the courses in chemistry is to give in the first place a knowledge of the fundamental principles of the science as a part of a general education; and afterwards a more extended knowledge of the subject and practice in manipulation to those who wish to devote themselves to pure or applied chemistry, or whose work along other lines will be made more efficient by a thorough training in chemistry. Engineering students are encouraged to become familiar with the principles on which manufacturing processes or industrial methods are based, so that a firm foundation may be laid for subsequent specialization in these directions. Opportunities are given for excursions to the plants of chemical industries located in and near Chicago.

The courses in general chemistry give a knowledge of the natural occurrence, methods of preparation, properties and reactions of the important elements and compounds, explain these facts according to modern theories, and point out their application to industrial processes. The greater part of the laboratory work is qualitative, but it includes quantitative experiments involving both gravimetric and volumetric methods, and also a few inorganic preparations on a somewhat elaborate scale. Lectures and recitations, four hours a week; laboratory work, six hours a week. Reference book, Newth's *Inorganic Chemistry*. Prerequisite: *Physics* 1-3.

1. **GENERAL CHEMISTRY.** Chemical change, three states of matter, solution and crystallization, elements and compounds, oxygen, hydrogen, and the elements of the chlorine group.

2. **GENERAL CHEMISTRY.** Continuation of Course 1. The remaining non-metallic elements; acids, bases, and salts; electrolysis.

3. **GENERAL CHEMISTRY.** Continuation of Course 2. The metals. Qualitative analysis is not taught, but some of the more important analytical reactions are studied, so that at the end of the course the student is expected to be able to recognize any simple salt and to understand the methods of separation of various groups and elements.

Students who have credit for the chemistry course of the ordinary high school are required to take the lecture and recitation work of 1, 2, and 3, but special laboratory work is arranged for them in the winter quarter. If they show suitable proficiency, they are excused from laboratory work for the rest of the year.

The courses in qualitative analysis begin with simple analysis and lead to the study of complex mixtures, minerals, alloys, etc. The lec

tures treat in considerable detail certain selected portions of the theoretical and physical chemistry, special reference being made to those principles which form the basis of analytical chemistry. Laboratory work, lectures, and recitations, ten hours a week. Text-book, Prescott and Johnson's Qualitative Analysis. Prerequisite: *Courses 1-3.*

4. QUALITATIVE ANALYSIS. Classroom work on the principles of analysis. General qualitative analysis.

5. QUALITATIVE ANALYSIS. Continuation of Course 4. Lectures on theoretical chemistry.

Courses 6 and 9 give the general methods of quantitative analysis. Courses 10 and 11 give the application of these methods to the problems of particular industries. The work is largely individual, and is supplemented by the reading of special works treating the respective subjects. Laboratory work, ten hours; lectures and recitations, two hours a week.

6. QUANTITATIVE ANALYSIS. Continuation of Course 5. Simple gravimetric and volumetric determinations leading to Course 9. Lectures and recitations on quantitative analysis.

9. QUANTITATIVE ANALYSIS. Moderately complex separations, volumetric precipitations, and oxidation and reduction.

10 and 11. QUANTITATIVE ANALYSIS. The application of the general methods of quantitative analysis to specific industrial products.

12. ANALYSIS OF ENGINEERING MATERIALS. The chemical tests commonly employed by engineers, including coal and gas fuel value determinations, flue gas analysis, lubricating oil tests, etc. Lectures on metallurgy are given as a part of this course. Prerequisite: *Courses 4 and 6.*

Physiography and Geology

In the courses of physiography and geology, lectures, recitations, and laboratory methods of work are used. The aim in physiography 1, 2, and 3 is to give a broad introductory course that shall open up the field of science and give the student a notion of its methods and scope. Physical geography is made the central subject. The study includes observations on the heavenly bodies, such illustrated lectures and laboratory exercises as are necessary for the student to make good use of his observations, lecture table demonstrations and laboratory exercises on the elementary physical and chemical phenomena fundamental to understanding the problems taken up in the physical geography, and, finally, a study of life with especial attention to the physiographic control of the distribution of life and of man's activities.

1. PHYSIOGRAPHY. The distribution of matter in space. The celestial bodies, their number, their size, distances, materials (kinds, and amount compared with space), physical conditions, arrangement in space and motions, with emphasis on the motion of the earth and its relations to the sun and moon; elementary meteorology and climat-

ology; oceanography. The study of a certain amount of physics is included: Density, pressure in liquids and in air, barometric phenomena, kinetic theory of gases, diffusion, properties of vapors, thermometry, change of state, transference of heat, specific heat, latent heat, atmospheric electricity. It is believed that there is economy in studying the broader principles first and their broader applications in connection with the more immediate applications in the study of physical geography.

2. **PHYSIOGRAPHY.** Constituents of the atmosphere and their relations to life; oxidation, carbonation and hydration in the belt of weathering and their effects on the atmosphere and on climate; the work of underground water in solution and deposition from solution; crystalization; soils and the relation of plants to underground water and to soil; the modern doctrines of the origin and development of the surface features of the earth, the agencies involved, the resulting forms and the great examples of these forms; a study of the topographic features of the continents. The elementary chemistry involved is studied as it is needed.

3. **PHYSIOGRAPHY.** A study of life and life processes. Especial attention is given to the distribution of life on the earth, its relation to soil, to topographic and climatic features and the control of these things over man. Frequent references are made to these subjects in the fall and winter quarters. They are here taken up in more systematic fashion.

4. **GENERAL GEOLOGY.** The elementary features of dynamical structural, and historical geology. Emphasis placed upon the leading facts and principles of the science and the more important events of geological history. For college students.

Prerequisite: *Courses* 1, 2 and 3; *Physics* 1-3 and *Chemistry* 1-3, or their equivalent.

Physiology and Bacteriology

1. **PLANT PHYSIOLOGY** and botany of food plants.

2. **PHYSIOLOGY AND PERSONAL HYGIENE.** Human anatomy and physiology from lectures, text, and illustrative material. Points of contact between the study of physiology and subjects which concern practical conduct, e. g., physical training, diet, reaction of body to immediate environmental conditions, conservation of nervous energy.

3. **BACTERIOLOGY.** A laboratory course dealing with bacteria, yeasts and molds. Studies in morphology, physiology and reproduction; making of culture media, of permanent mounts; exercises in elementary analysis of air, milk, water, etc., from different sources.

Domestic Economy

The courses in Domestic Economy are planned with reference to the needs of two classes of students: (1) Young women who are preparing to teach cooking and sewing; (2) Girls who wish to acquire a

knowledge of the household arts in connection with other academy studies.

The teachers' courses in domestic economy are of college grade and presuppose a high school training. During the second year all students are required to teach classes in cooking and sewing. These practice classes are usually formed in neighboring social settlements.

Excursions to various points of interest in the city are planned at intervals during the year. These include visits to a flour mill, to a wholesale bakery, and to a large market, as well as to the stockyards, to the Field Columbian Museum, and to the Board of Health laboratories.

No school uniform is worn, but wash waists and uniform aprons are required for cooking classes.

While the Institute does not engage to obtain positions for its graduates, many calls are made upon it to suggest candidates for positions of all kinds, and it co-operates with its graduates in securing openings for them.

Following are the courses of instruction that are offered in this department:

A, B, C. **SEWING.** Courses designed for the younger pupils. They include the taking of measurements and the cutting and making of undergarments, shirtwaists, thin gowns, and dressing-sacks. Use of machine with simple attachments. Talks on materials and implements used.

A2, B2, C2. **SEWING AND MILLINERY.** A continuation of A, B and C. Calculating the amount and cost of material required, and the planning, cutting, fitting, and making of two complete garments each quarter.

D, E, F. **SEWING.** Courses designed for those who are preparing to teach; include, in addition to the sewing defined under A, B, and C, drafting, the study of textiles, and the principles of design. Simple designs in flat colors, such as borders, rugs, etc.; color harmony; lettering for monograms; proportions of the human figure; sketching from life; designs for undergarments, waists, dresses, hats, etc.

G, H, I. **SEWING AND MILLINERY.** A continuation of D, E, and F. Making of unlined dresses, hats appropriate for the different seasons. Design as applied to decoration and stenciling. Textiles and weaving. The teaching of sewing and millinery in the elementary and secondary schools. A short, practical course in laundry, including lectures.

J. **ADVANCED DRESSMAKING.** Drafting and making of lined dress, either wool or silk, requiring more difficult problems. Prerequisite: Courses D to J.

K. **TEXTILES.** Lecture work, the historical development of the textile industry, the climatic conditions, and the manufacture of fabrics.

L. **TEXTILES.** Laboratory work. Experiments in dyeing. Weaving of various kinds.

M. APPLIED DESIGN. Embroidery for underwear and dresses, table covers, sofa pillows, mats, etc.

1, 2. COOKING. Courses designed for the younger pupils. Manufacture, selection, and preparation of food. Marketing, cooking, and serving.

3. HYGIENE AND PHYSIOLOGY. A brief course in physiology, with hygiene, home nursing, and sanitation.

4. COOKING. Course designed for those who are preparing to teach. Nature and uses of food, and changes effected by heat, cold, and fermentation; uses and application of preservatives.

5. COOKING. A continuation of 4. Principles of the selection and preparation of foods. Care and manufacture of food.

6. COOKING. Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: *Courses 7 and 8.*

7. FOOD AND DIETETICS. A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry 1-3.*

8. FOOD AND DIETETICS. A continuation of 7. Diet and dietaries. The detection of adulteration and preservatives in food.

9. THE HOUSEHOLD. Evolution of the house and of the family. A special study of woman's changing economic position and its effect upon the family.

10. SANITATION, HOUSEHOLD AND PUBLIC. The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common and transmissible diseases. Lectures and reference work, field excursions. Prerequisite: *Bacteriology 3.*

11. INSTITUTIONAL MANAGEMENT. Discussion of such problems as the kitchen and dining room equipment for the home and various types of institutions. A study of the duties of dietitian. Practice work in planning and keeping household accounts, the preparation and serving of meals is obtained by a lunch room serving from thirty to forty people daily in charge of the class. Prerequisite: *A knowledge of cookery.*

12. INSTITUTIONAL MANAGEMENT. A continuation of 11.

13. THE HOUSE. A study of the furnishing and management of the house from the artistic, practical, and economic standpoints. Methods of keeping household accounts. The cost of living and the apportionment of the income.

14. TEACHING OF DOMESTIC SCIENCE. Discussion of different types of equipments, of content of courses in domestic science for various school grades, and of lesson plans. Supplementary reading required.

15. SPECIAL PROBLEMS IN DOMESTIC ECONOMY. The work in this course may be along any line connected with the subject according to the preference of the student and will be in charge of the instructor under whom the work chosen would naturally fall.

History and Economics

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

Five courses are given in economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. **ANCIENT HISTORY.** The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. **ANCIENT HISTORY.** The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. **ANCIENT HISTORY.** The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. **AMERICAN HISTORY.** The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, the history of the English colonies, the Revolution and the separation from the mother country, the institution of confederate government and its failure.

5. **AMERICAN HISTORY.** The creation of the Constitution and the organization of the new national government, the development and meaning of national political parties, the foreign relations leading to the War of 1812, the further political and industrial growth of the nation, the rise of sectionalism due to the development of divergent systems of labor and industry in North and South, the culmination of the sectional contest, the Civil War.

6. **AMERICAN HISTORY.** The results of the Civil War, the work of national reconstruction, the final conquest of the West, the rise of the new industrial order, the political and social problems resulting from it, the Spanish War and the abandonment of the policy of national exclusiveness, America as a world power.

7. **MEDIAEVAL EUROPE.** An outline course in general European history covering the period from the reorganization of the Roman Empire under Diocletian to the close of the fifteenth century, treating in such detail as the time will permit the civilization and institutions peculiar to the period.

8. **MODERN EUROPE.** From the beginning of the sixteenth century to the present time.

9. **ENGLISH HISTORY.** An outline course in English history from the earliest times to the present day. Such emphasis as the scope of the course permits will be placed upon the modern period and the career of imperial England.

10. **PRINCIPLES OF POLITICAL ECONOMY.** Designed to give a working knowledge of the principles of Political Economy. An exposition of the laws will be given in class lectures. The practical working of these laws will be tested by assigning problems for solution.

11. **ECONOMIC SURVEY.** Intended to serve a double purpose; first, to give those students who cannot devote more time to the subject a general survey, and secondly, to give a foundation for further specialization to those who may desire to pursue the subject further. The topics discussed are Money, Credit, and Banking; Foreign Exchange; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform; and Socialism.

12. **LABOR PROBLEMS.** The purpose of the course is to present the labor problems of to-day, and to note the progress made in finding a solution for each. Some of the subjects discussed are arbitration and conciliation, employers' liabilities, workingmen's insurance, women in industry, and child labor. A comparative study will be made of the labor laws of the leading industrial countries, including the United States and the various individual states.

13. **AMERICAN CONSTITUTIONAL HISTORY.** The Convention of 1787, the organization of the federal government, the development of the national judiciary, the state-rights controversy, and other important constitutional topics will be studied. This is not a narrative course, but is designed for those who have completed 7, 8, and 9, and for other mature students.

14. **INDUSTRIAL HISTORY OF THE UNITED STATES SINCE THE CIVIL WAR.** This course will aim to place emphasis upon the industrial development of the United States since the Civil War and to point out the industrial factors which are making the United States of to-day. The subjects discussed are: The economic and social state of the nation in 1865, the commercial and industrial demoralization in the South at the close of the war, the industrial transformation of the South, the race problem economically considered, the conservation of material resources, the industrial factors making for federal as contrasted with state supremacy.

15. **MUNICIPAL PROBLEMS.** The course aims to present the many

problems connected with the government and control of our large cities. The subjects discussed are: Municipal home rule, municipal franchises, and public utilities. The course is designed for mature students.

Philosophy

1. **PSYCHOLOGY.** [Required of all candidates for the degree of B. S. in Domestic Economy.]

2. **INTRODUCTION TO PHILOSOPHY.** The meaning of the word "philosophy" as used in academic circles to-day; the nature of reflective thought as compared with ordinary thought, scientific thought, and poetic thought; the chief philosophical problems; the chief types of philosophic doctrine. [The course is open to sophomores and juniors. A certain amount of reading in psychology is presupposed and required. Students who intend to elect the course in the spring are requested to consult with the Dean of College Students at the opening of the year in order to arrange for this reading.]

English

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on pages 12 and 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is designed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, *First Manual of Composition*, revised edition; Lewis, *Introduction to the Study of Literature*; Moulton, *Old Testament Stories*; Shakspeare, *The Merchant of Venice*, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the *Riverside Literature Series*, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's *Life of Lincoln*. These books are referred to below by abbreviations.

1. Average sections cover *First Manual*, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover *First Manual*, II., and *Introduction*, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover *First Manual*, III., and *Introduction*, VI.-X. Special sections abbreviate *Introduction*.

4. Average sections cover *First Manual*, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover *First Manual*, V., Schurz's *Lincoln* (133), and Warner (37). Special sections omit 37.

6. Average sections cover First Manual, VI., and The Merchant of Venice.

1-6. COMPOSITION. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspeare's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with the American Colonies; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

8. COMPOSITION. The work is based on Lewis's Second Manual of Composition.

9. Shakspeare's As You Like It, and Julius Caesar; Addison's Sir Roger de Coverley Papers; Goldsmith's The Deserted Village; Dicken's A Tale of Two Cities; George Eliot's Silas Marner; Irving's The Sketch Book; Ruskin's Sesame and Lilies; Arnold's Sohrab and Rostum; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur.

10. ENGLISH COMPOSITION. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

11. ENGLISH LITERATURE. The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. SHAKSPEARE. Dowden's Shakspeare Primer, Hudson's School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest.

13. ENGLISH COMPOSITION. Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. THE ENGLISH ESSAY. A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course. (*Not given in 1910-11; given in 1911-12.*)

15. MILTON. A study of the Paradise Lost, preceded by the reading of Lucretius and Dante in translation, and accompanied by lectures on the cultural epochs represented by these philosophical poets. (*Given in 1910-11; not given in 1911-12.*)

A, B, C. ENGLISH FOR ENGINEERS. The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German life and literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-12 cover a period of four years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. ELEMENTARY GERMAN. Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs. Easy prose reading.

C. ELEMENTARY GERMAN. Grammar continued. Verb forms emphasized. Easy prose reading.

D. READINGS IN EASY NARRATIVE PROSE. Continued drill on grammatical forms. Prose composition based on texts read.

E. NARRATIVE PROSE AND ONE EASY COMEDY. Reproductive translation into German. Conversational exercises.

F. MODERN PROSE READINGS. Reproductive translation and independent themes.

G. MODERN PROSE.

H. GERMAN PROSE COMPOSITION. Pope's text-book.

I. A MODERN NOVEL, AND SCHILLER'S WILHELM TELL.

1, 2, 3. ELEMENTARY GERMAN FOR COLLEGE STUDENTS. Thomas's

Grammar, Part 1. *Leander's Traumereien*. Schweitzer-Simonnot's *Lesebuch für Quarta und Tertia*.

4. HISTORICAL PROSE. An essay, a novel, and a drama.
5. PROSE COMPOSITION AND THEMES.
6. MODERN NOVELS. Ebner-Eschenbach, Freytag, Sudermann.
- 7, 8. SCHILLER'S LIFE AND WORKS.
9. THE MODERN DRAMA. Kleist, Grillparzer, Hebbel.
- 10, 11. LIFE AND WORKS OF GOETHE.
12. DRAMAS OF HAUPTMANN AND SUDERMANN.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. ELEMENTARY FRENCH. Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: *Beginner's French*, Francois.

2. ELEMENTARY FRENCH. Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: Fraser and Squair for reference. Reading: Francois and Giroud's *Simple French*. Sans Famille (Malot), *Le Petit Chose* (Daudet).

3. MODERN SHORT STORIES. Texts for the quarter will be selected from the following: *Le Tour de la France* (Bruno), *Colomba* (Mérimée), *Jeanne d'Arc* (Lamartine), *Le Pays de France* (Foncin), *Histoire d'un Paysan* (Erckmann et Chatrian), *Les Normands en Angleterre et en France* (Thierry), *Grandes Découvertes Modernes* (Muller). Prose and conversation based on texts read.

4. MODERN FRENCH COMEDIES. Texts for the quarter will be selected from the following: *Moi* (Labiche et Martin), *Le Luthier de Crémone*, *Le Trésor* (Coppée), *Mlle. de la Seiglière* (Sandeau), *Le*

Voyage de Monsieur Perrichon (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. **THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO.** Reading: *Quatrevingt Treize*, *Hernani*, *La Chute*, and other works of the period. Prose; frequent reproductive exercises; letters, business and friendly, twice a week.

6. **MOLIÈRE.** A careful study of his chief comedies and ideas. Reading: *Le Bourgeois Gentilhomme*, *L'Avare*, *Les Précieuses Ridicules*. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. **THE CLASSIC DRAMA: CORNEILLE, RACINE.** Reading: *Le Cid* *Polyeucte* (Corneille); *Athalie*, *Andromache* (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. **FRENCH CLASSIC PROSE.** Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects

9. **CRITICAL PROSE OF THE NINETEENTH CENTURY AND ESSAYISTS.** Sainte Beuve, Taine, Brunetière, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. **ELEMENTARY LATIN.**

3. **ELEMENTARY LATIN.** Selections from Ritchie's *Fabulae Faciles*.

4. **SELECTED FABLES AND STORIES** from Roman history.

5, 6. **SELECTIONS FROM CAESAR'S GALLIC WAR.**

7, 8. **CICERO, ORATIONS AGAINST CATILINE.** A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. **CICERO, PRO ABOHIA; PRO MARCELLO; SELECTED LETTERS.** Prose writing as in Courses 7 and 8.

10. VIRGIL, *ÆNEID*, I., II. Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.
11. VIRGIL, *ÆNEID*, III., IV.
12. VIRGIL, *ÆNEID*, V., VI. General review. Latin writing.
13. LIVY. Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.
14. HORACE. Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.
15. LATIN COMEDY. Plautus and Terence. *Captivi*, *Menæchmi*, and *Phormio*.
16. PLINY'S LETTERS, supplemented by reading of Juvenal's satires and Martial's epigrams.
17. TACITUS. *Agricola*, *Germania*, and selections from the *Annales*.
18. CICERO. *De Amicitia* and *De Senectute*. LUCRETIVUS, *De Rerum Natura*.

Greek

1. ELEMENTARY GREEK. The essentials of the grammar, with illustrative sentences in Greek and English. Selections from the *Anabasis*.
2. XENOPHON, *ANABASIS*, Book I. Composition; grammar. The modification of verbal stems, euphonic changes, and drill in principal parts of irregular verbs.
3. XENOPHON, *ANABASIS*, Books II., III., IV. Greek writing; grammar.
4. HOMER, *ILIAD*, Books I., II., III.; selections from IV.-XXIV.
5. HOMER, *ODYSSEY*; selections from Books I.-XIII.
6. PLATO, *APOLOGY* AND *CRITO*. XENOPHON, *MEMORABILIA*. Greek writing.

Decorative Art

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the handling of materials in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. FREE-HAND DRAWING. Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. **FREE-HAND DRAWING.** Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. **FREE-HAND DRAWING.** Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

**FOR COURSES OF INSTRUCTION FOR SHOP APPRENTICES,
SEE SPECIAL BULLETIN ISSUED IN SEPTEMBER, 1911.**

Evening Session of 1911-1912

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Instructor in Steam Laboratory
ROBERT FREDERICK BIESEMEIER
Instructor in Machine Shop Work
HORACE BERNARD MCCABE
Instructor in Machine Shop Work
JOHN HENRY SMALE, A. B.
Instructor in Charge of English and Commercial Subjects
JUDSON THOMAS WEBB
Instructor in Pottery

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HENSON H. THOMAS Instructor in Chemistry	CONSIGLIA BARTOLOMEI Instructor in Italian
GORDEN CROWELL ABBOTT Instructor in Machinery Drawing	CORNELIA PIERCE Instructor in Latin
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LLOYD L. SMITH, B. S., E. E., C. E. Instructor in Architectural Drawing	JANE HEAP CAROLYN MAULSBY Instructors in Metal Work
NORMAN L. BAKER, B. S. Instructor in Architectural Drawing	CAROLINE HAMMERSCHMIDT Instructor in Bookbinding
MARY KANE ROSE KANE Instructors in Physical Culture	WALTER E. BAUERLE ADOLPH C. FENSHOLT HARRY N. GILBERT, M. E. THEODORE W. PETERSEN RICHARD H. R. WHITEHEAD, M. E. Laboratory Assistants
CHARLES B. KAZDA CHARLES R. KOLKOW, S. B. J. GEORGE LOEDING ARTHUR E. VAN HAGAN, B. S. FRANK H. WADE, M. E. Instructors in Mathematics	
SAMUEL E. BIRD ERNEST N. BRAUCHER, B. S. MAX A. GIFFEY EDWIN PHELPS JOHN E. POOLE, B. S. BERNARD RIFFEL, M. E. VICTOR L. SHERMAN Instructors in Mechanical Drawing	
CHARLES J. CLARK Assistant in Foundry	
GRACE LUCILE HENNECKE Instructor in Millinery	

General Information

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, bookkeepers, firemen, nurses, stenographers and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Dean and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for one week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 4 to 10 o'clock Monday, Tuesday, Wednesday and Thursday evenings from October 2 to May 16.

The Library is open from 4 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

For the convenience of teachers in the public schools certain courses in Mechanic Arts and in Domestic Economy are given from 4 to 6 in the afternoon and on Saturday mornings.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses

MECHANIC ARTS

6, 10—Mechanical Drawing, 3 terms—	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
5a, 5b—Architect'al Drawing, 3 " "	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
2, 4—Wood and Fdy. Work, 3 " "	Saturday morning, 8:30-12:30.
20a, 22—Machine Shop Work, 3 " "	Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
20a, 22—Machine and Forge, 3 " "	Saturday morning, 8:30-12:30.

ENGINEERING

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. & W., 6-8 or 7-9 or 8-10
4. Electrical Laboratory, Electrical Measurements. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
15 Steam Laboratory, Heat and Work. Tu. and Th., 7:30-9:30.	15b Steam Laboratory, Steam Engine. Tu. and Th., 7:30-9:30.	44 Testing Laboratory, Gas Engine Practice. Tu. and Th., 7:30-9:30.
36a Alternating Currents, Electrical Instruments. 37a 10 Tu. and Th., 7:30-9:30.	36b Alternating Currents, Transformers and Transmission. 37b Tu. and Th., 7:30-9:30.	36c Alternating Current Machinery. 37c Tu. and Th., 7:30-9:30.
33a Structural Steel Work. Mo. and We., 7:30-9:30.	33b Structural Design. Mo. and We., 7:30-9:30.	33c Concrete Construction. Tu. and Th., 7:30-9:30.

MATHEMATICS

7, 8—Arith. and Accounting, 3 terms, Tu. and Th., 7:30-9:30.
1-3—Elementary Algebra, 3 " " Tu. and Th., 7:30-9:30.
10, 11, 14—Algeb. and Trigonometry, 3 " " Tu. and Th., 7-9.
4-6—Geometry, 3 " " Tu. and Th., 7-9 and 8-10.
19—Engineering Mathematics, First year—Autumn and Winter, Mon. and Wed., 7-8; Spring, Tues., 7-9.
20—Engineering Mathematics, 3 terms—Second year, Th., 7:30; 21 Third year, Mon., 7:30.

CHEMISTRY

1-3 Practical Chemistry, 3 terms—	Mon. and Wed., 7:30-9:30
4, 5, and 6. Qualitative and Quantitative Analysis 3 " "	Mon. and Wed., 7:30-9:30

DOMESTIC ECONOMY

1-3 Physiology and Bacteriology, 3 terms	Mon. and Wed., 4-6
4-6 Cooking, 6 " "	Mo. and We., 4-6, 7-9
7, 8 Food Chemistry, 3 " "	Tu. and Th., 4-6, 7-9
A-I Sewing, 3 " "	Sat., 8-12.
	Saturday, 8-12.
	Mon. and Wed., 4-6
	Tu. and Thur., 7-9
	Sat. 8-12.

ENGLISH, GERMAN, AND LATIN

1-3—Elementary English, 3 terms, Mo., We.—Tu., Th. 7-9
4-6—Intermediate English, 3 " " " " 7-9
7-9—Advanced English, 3 " " " " 7-9
A-F—German, 3 " " Tu. and Th., 7-9
1-12—Latin, 3 " " Mon. and Wed., 7-9
1-3—French, 3 " " Mon. and Wed., 7-9

POTTERY AND PHYSICAL CULTURE

Pottery, 3 terms, Tu. and Th., 4-6 and 7-9; Sat., 8-12
Physical Culture for Women, 3 " " Mon. and Wed., 8-10.

Description of Evening Courses

Mechanic Arts

2. **ELEMENTARY WOODWORK.** For beginners and teachers preparing to teach Manual Training. Care and uses of tools. Talks on woods and their characteristics. Construction of models.

2a. **CARPENTRY AND JOINERY.** Designing and laying out parts of buildings. Computing the cost of material and labor. Practice in the construction of models.

2b. **CABINET WORK.** Designing interior finish and furniture for buildings. Practice in the construction and finishing of furniture.

4. **FOUNDRY PRACTICE.** Work in molding, core making, and melting, supplemented by lectures and demonstrations.

5. **ELEMENTARY MECHANICAL DRAWING.** For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

5a. **ELEMENTARY ARCHITECTURAL DRAWING.** For beginners. Lettering and instrumental practice. Arrangement of posts, girders, joists, and partitions. Various roofs for a given floor plan. Designing from sketches, arrangement of rooms, rise and run of stairs. Materials of construction. Design of flats and blocks, plumbing, heating, specifications, and bills of material.

5b. **ROOF AND STAIR DRAWING.** For carpenters, joiners, and carpenter's apprentices. Work in roof framing with methods for obtaining lengths and cuts of the different rafters in a complicated roof. Design and laying out of straight, winding, and circular stairs; also eases, ramps, and goose necks for different types of architecture.

6. **ADVANCED MECHANICAL DRAWING.** Intended to supplement course 1 by more practice in machine details.

7. **PATTERN MAKING.** Elementary and advanced. Machinery and architectural pattern-work.

10. **MACHINERY DRAWING.** The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 1 and 3 and for experienced draftsmen.

20. **MACHINE TOOL WORK.** Description of the construction and operation of engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

20a. **MACHINE TOOL WORK.** Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

23. **GEAR CUTTING.** Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

22. **TOOL AND DIE MAKING.** Practice with the lathe, planer, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making, punching, bending, and forming dies and adjusting in punch press.

Engineering

1. **ENGINEERING PRINCIPLES.** One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms. Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. **ENGINEERING PRINCIPLES; ELECTRICITY.** One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to meet in practical work.

3. **PHYSICS LABORATORY.** Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. **ELECTRICAL LABORATORY.** Electrical Measurement Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. **ELECTRICAL LABORATORY.** Direct Current Generators and Motors. Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. **ELECTRICAL LABORATORY.** Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

15. **STEAM ENGINEERING.** Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector. Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

15b. **STEAM ENGINEERING.** Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

33a. **STRUCTURAL STEEL.** Composition and Equilibrium of Forces,

parallel forces and center of gravity; statics of simple structures. Strength of materials; tension, compression, sheer, and flexure; ties, columns, beams, rivets, and pins.

33b. **STRUCTURAL DESIGN.** Joints, simple roof truss, plate girder, study of simple bridge, specifications. Truss bridges, dead load, live load, impact and wind stresses, computation of sections.

33c. **CONCRETE CONSTRUCTION.** Lecture, laboratory, and drafting room work. Composition and properties. Construction and tests of reinforced columns and beams. Specifications and unit strains. Floor construction and design.

36a. **ALTERNATING CURRENTS.** Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

36b. **ALTERNATING CURRENTS.** Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reactances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

36c. **ALTERNATING CURRENT MACHINERY.** Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

37a, b, c. Continuation of 7, 8, 9, respectively.

44. **GAS ENGINE PRACTICE.** Combustion of fuels. Internal combustion engines. Four-cycle engine; two-cycle engine. Details of construction of pistons, governors, valves, and throttle-regulators.

Mathematics

1-3. **ELEMENTARY ALGEBRA.** Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4-6. **PLANE GEOMETRY,** including the solution of simple original exercises and numerical problems. **SOLID GEOMETRY,** including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

7. **ARITHMETIC.** Fractions, percentage in its simpler applications, and common measurements.

8. **ACCOUNTING AND PENMANSHIP.** Journalizing, accounts, retail, double entry, and the wholesale sets.

10-11. **ADVANCED ALGEBRA.** A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permuta-

tions and combinations, and the use of four and five place tables of logarithms.

14. PLANE TRIGONOMETRY. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. PLANE ANALYTIC GEOMETRY. Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

19. ENGINEERING MATHEMATICS. Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power.

20. ENGINEERING MATHEMATICS. Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

21. ENGINEERING MATHEMATICS. Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry

1-3. PRACTICAL CHEMISTRY. The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

4, 5. QUALITATIVE ANALYSIS. The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

6. QUANTITATIVE ANALYSIS. As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may

begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy

4-6. **COOKERY.** Practical work in the preparation of food, with the study of the food elements and the effect of heat upon each. Invalid cookery.

D-I. **SEWING AND MILLINERY.** Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English

1-3. **ELEMENTARY ENGLISH.** Composition and word study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

4-6. **INTERMEDIATE ENGLISH.** Composition and advanced grammar; rhetoric and the study of English masterpieces. Chief object, to train the student in the use of accurate and idiomatic English. Much attention is given to sentence and paragraph structure, punctuation, and spelling. Two or more themes each week are required.

7-9. **ADVANCED ENGLISH.** Composition, advanced rhetoric, and English literature. Object, to teach the principles of effectiveness in the use of the language, the application of these principles in theme writing, and a sound appreciation of the best English literature.

14. **THE ENGLISH ESSAY AND SHAKSPERE.** A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Six plays of Shakspeare are read and discussed.

Latin, German, French, and Italian

The courses in foreign languages are designed to meet the needs not only of beginners but also of those who wish to do more advanced work.

Book Binding

Adapted to the needs of teachers of the public schools. Exercises for each of the grades are outlined and executed.

Summer Session—1911

July 3 to August 11

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION

GEORGE NOBLE CARMAN, A. M.

Director

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Dean of Summer School

OFFICERS OF INSTRUCTION

FRED A. ROGERS, B. S.

Professor of Physics

PHILEMON BULKLEY KOHLSAAT, Ph. B.

Assistant Professor of English

DIC HECTOR TROWBRIDGE, B. S.

Assistant Professor of Chemistry

WILLIAM PARKER HAWLEY, B. S.

Assistant Professor of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.

Assistant Professor in Mechanics

FRED LEWIS TURNER, A. M.

Assistant Professor of Latin

JUDSON FISKE LEE, A. M.

Assistant Professor of History

ALPHONSO WIRTH CAVANAUGH

Instructor in Mathematics

GEORGE FREDERICK CASSELL, A. B.

Instructor in German and English

JULIA GRACE MERRILL

Instructor in Cooking

LOIS MARTIN

Instructor in Sewing and Textiles

GRACE LUCILE HENNEBOKE

Instructor in Millinery and Sewing

JACOB M. KINNEY, A. M.

Instructor in Mathematics

JUDSON THOMAS WEBB

Instructor in Pottery

ADOLPH C. FENSHOLT

Instructor in Physics

EDWIN D. LEMAN

Instructor in Chemistry

PAULINE GLEASON

Instructor in French and English

CHARLES B. KAZDA

Instructor in Mathematics

JOHN HENRY SMALE, A. B.**M. ELIZABETH SNEED****FLAVILLA NORMINGTON****ANNA G. BAEK****HELEN PIERCE**

Instructors in Grade Work

LEE FRANCOIS SUPPLE

Assistant in Chemistry

General Information

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.
2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.
3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, covering the work of each year of the high school in English, mathematics, history, and foreign languages.

4. For pupils of the sixth, seventh and eighth grades of the public school, classes are formed to do the regular work of these grades.

The tuition for the summer term for a course in one subject five hours a week of class instruction, is five dollars. In laboratory, drawing, shop work, and grade work, ten hours, or a fraction thereof, count as five in determining the tuition.

Courses of Instruction

Mechanic Arts

2. **WOOD WORK.** A fundamental course preparatory to pattern work and to the arts and crafts.

2a. **WOOD WORK.** Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. **CABINET MAKING.** A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

2c. **MANUAL TRAINING.** Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

7. **ELEMENTARY PATTERN MAKING.** Intended for students in Engineering and teachers of Manual Training.

8. **ADVANCED PATTERN MAKING.** Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

5. **INSTRUMENTAL DRAWING.** A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. **PROJECTION DRAWING.** Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. **MACHINE DRAWING.** Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing.

More advanced machine design will be taught if desired.

Mathematics

1. **ELEMENTARY ALGEBRA.** Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. **ELEMENTARY ALGEBRA,** four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. **CONCRETE GEOMETRY,** one day a week.

3. **ELEMENTARY ALGEBRA,** four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. **CONCRETE GEOMETRY,** one day a week.

4. **PLANE GEOMETRY.** Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. **PLANE GEOMETRY.** Circles, ratio and proportion, similar polygons.

6. **PLANE GEOMETRY,** completed.

10, 11. **ADVANCED ALGEBRA.** A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. **SOLID GEOMETRY.** Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. **COLLEGE ALGEBRA.** Permutations and combinations, limits, convergence of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. **PLANE TRIGONOMETRY.** Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. **PLANE ANALYTIC GEOMETRY.** Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

Physics and Engineering

1-3. **GENERAL PHYSICS.** An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

4-6. **ADVANCED PHYSICS.** An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely

individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

35-37. ELECTRICAL LABORATORY. The courses in this department will be arranged to suit the individual student.

Chemistry

All courses are designed to meet, as far as possible, the needs of each student.

A-C. GENERAL CHEMISTRY. Academy course.

1-3. GENERAL CHEMISTRY. College course.

4, 5. QUALITATIVE ANALYSIS.

6. QUANTITATIVE ANALYSIS. Analysis of foods, etc.

7. ORGANIC CHEMISTRY. General laboratory work.

Domestic Economy

4. COOKING. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A-C. SEWING. Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

D-F. SEWING. Cutting and making of shirtwaists and wash dresses. Four hours a day.

History

1-3. ANCIENT HISTORY, from the earliest times to 800 A. D.

4-6. UNITED STATES HISTORY. An advanced course with special attention to the sources and formation of the Constitution, its operation, and the history of political parties.

9a. ENGLISH HISTORY, from the Norman conquest to the present time.

English

A. READING, GRAMMAR, AND COMPOSITION. A course in elementary English in preparation for admission to the Institute.

1-3. LITERATURE AND COMPOSITION. A review of the required English of the first year.

4-6. LITERATURE AND COMPOSITION. A review of the required English of the second year.

7. LITERATURE. The "study-books" required for college entrance in 1911.

9. LITERATURE. The "reading-books" required for college entrance in 1911.

German, Latin, and French

Such elementary classes as may be necessary to meet the demands of the students in attendance.

Pottery

The production of artistic pottery. The instruction will be adapted to the needs of teachers.

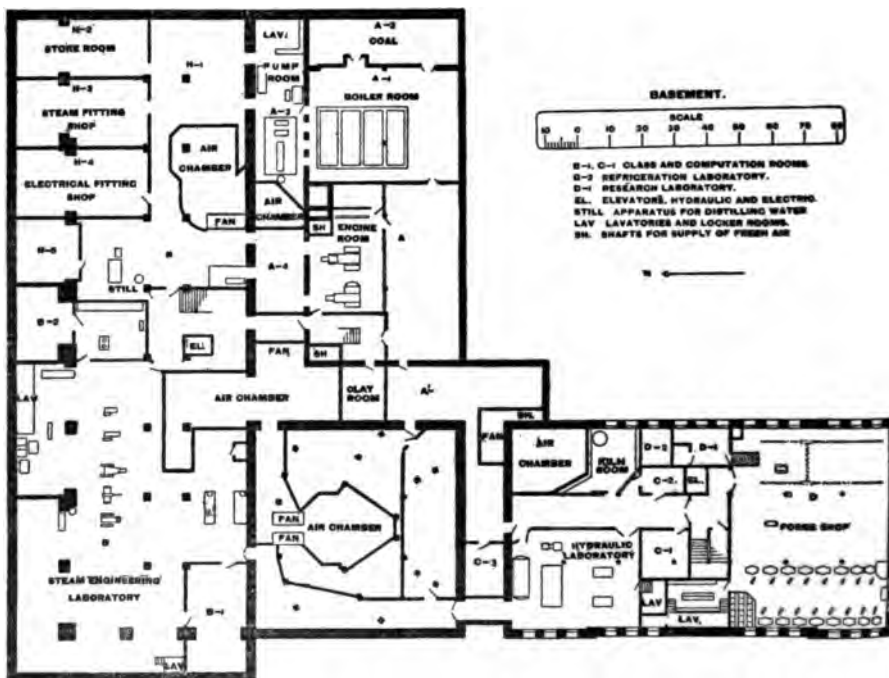
Buildings and Equipment

The buildings of the Institute represent an expenditure of approximately \$400,000, and the equipment, \$200,000.

The main building as shown in the illustration is 195 feet on Madison street and 250 feet on Robey street.



In the basement are located the boiler and engine rooms; air chambers for ventilating system; steam and electrical fitting shops; steam, hydraulic, and cement testing laboratories; kiln and clay rooms for Pottery Department; forge shop; store rooms, lavatories and locker rooms.



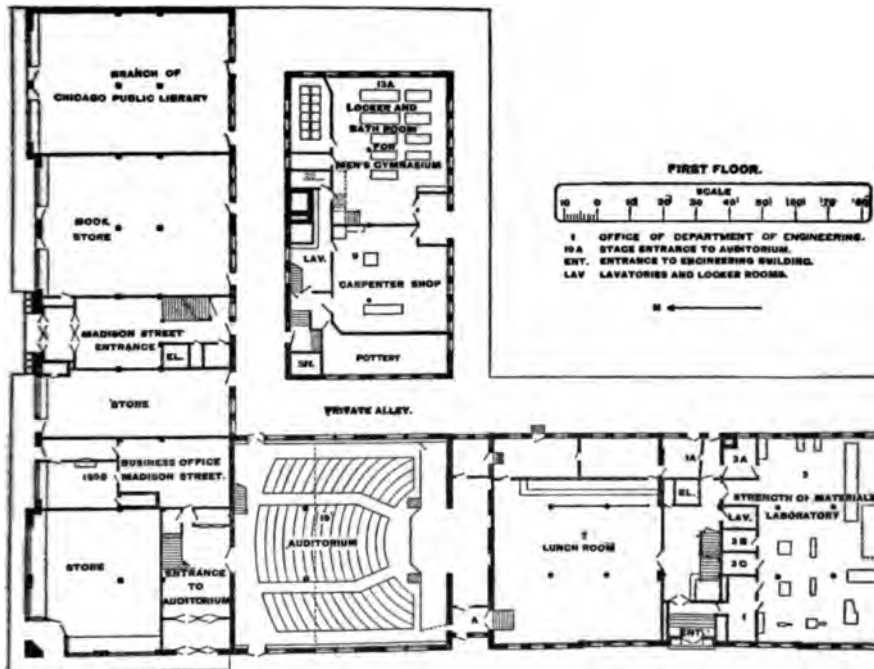
The forge shop accommodates a class of sixteen in ordinary forge work. In the special equipment are a 200 lb. steam hammer, a large forge, a gas tempering forge, a brazing forge, an angle bender, a bolt header, a power hack saw, and an emery grinder.

The hydraulic laboratory is equipped with weighing, pressure, and weir tanks, pumps, impulse wheel, meters, water ram, and the necessary instruments and tools.

The principal machines in the steam laboratory are a 30 h. p. experimental boiler, 8 by 20 inch Corliss engine, 10 kw. Kerr turbine generator set, three experimental steam engines, surface condenser, complete refrigerating unit, steam injectors, brakes, indicators, calorimeters, and gages.

The main entrance and Business Offices of the Institute are on Madison street. Here also is a branch of the Chicago Public Library. The remainder of the first floor on Madison street is rented for stores.

On Robey street are the Auditorium with main and stage entrances, and Lunchroom with kitchen and store rooms adjoining.

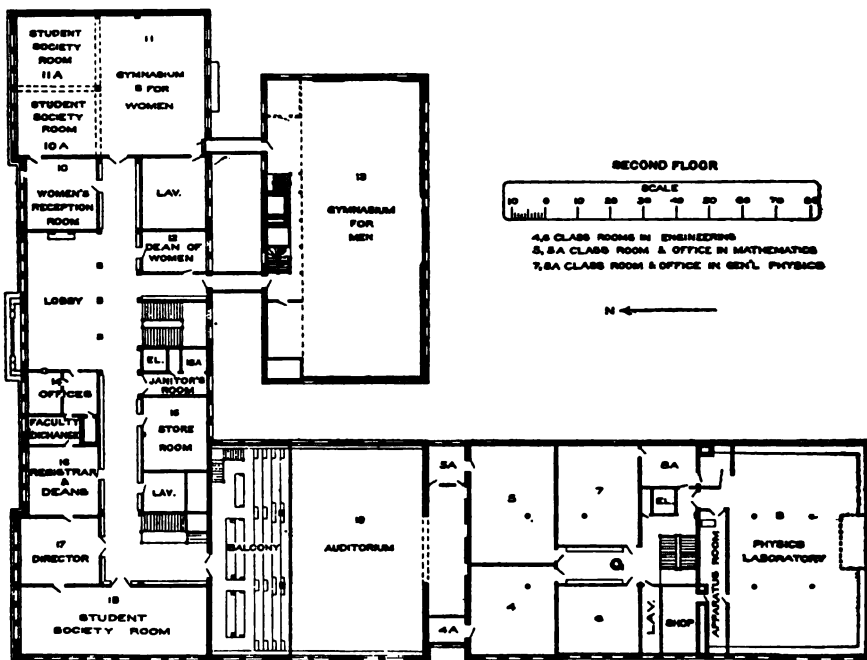


The seating capacity of the Auditorium is 650. The stage is fitted with scenery and dressing rooms for the use of dramatic clubs. It is also equipped with hydraulic elevator, making possible the exhibition of apparatus for demonstration purposes from any part of the building. The Auditorium thus serves as a lecture room for the Department of Physics.

The south end of the first floor is the Mechanical and strength of materials laboratory. In the equipment are two single cylinder four cycle and one two-cylinder two cycle gas engines, a Thurston oil tester, two testing machines of 40,000 and 200,000 lbs. capacity, a torsion, an impact, and a cement testing machine with the necessary gages, indicators, and other instruments.

The equipment for surveying is kept in this laboratory. There are transits, levels, and field equipment for ten parties.

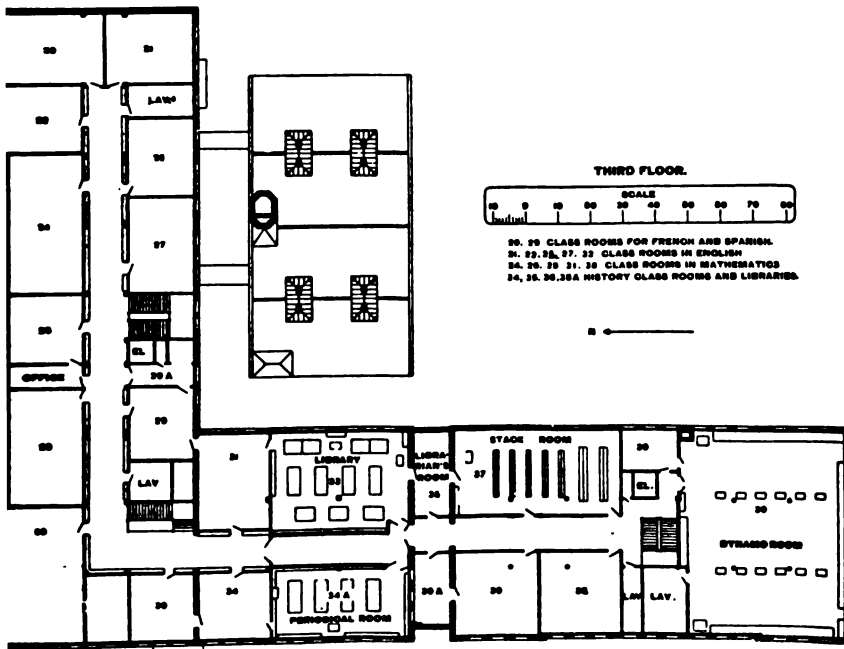
In the detached first story part, separated from the main building by private alley, are lockers and bathrooms of the boys' gymnasium, the pottery class room and carpenter shop.



The Lobby and Administrative Offices are on the second floor of the Madison street side. Here too are the gymnasium, students' society rooms, and the entrance to the balcony of the Auditorium. On the Robey street side is the elementary physics laboratory arranged to accommodate the large day and evening classes in first year physics. Sixteen groups of from two to four students can be accommodated. The benches have connections for water, compressed air, gas, direct current, and alternating current.

The four class rooms on this floor are used by the departments of mathematics, physics, and engineering.

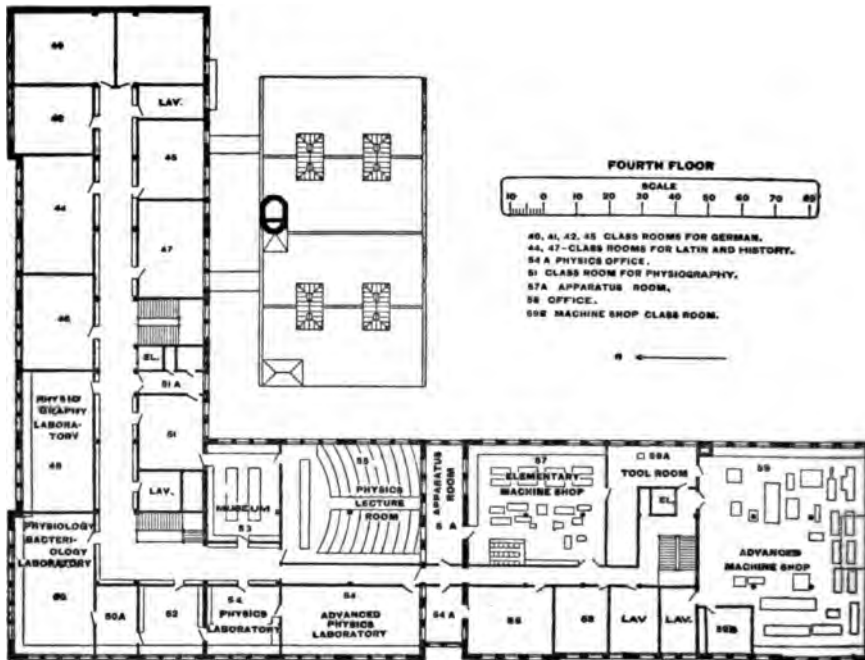
On the third floor are class rooms, Library, and the Dynamo Laboratory. The Library is convenient of access from all parts of the building. It contains about 20,000 volumes and 3,000 pamphlets, selected with immediate reference to the needs of each department. The dynamo laboratory is provided with a full



equipment including direct current motors, arc dynamo, three and two phase alternators, rotary converters, induction motors of different types, transformers, and the necessary instruments and accessories. A class of thirty students can be accommodated.

Besides class rooms, on the fourth floor, are the physics lecture room with a seating capacity of 100, the museum and laboratory for the Department of Physiography, laboratories for physiology, bacteriology, and advanced physics, the Engineering Society room, and machine shops.

The advanced machine shop occupies the south room. The principal machines are five engine lathes of various makes and sizes, one speed lathe, one screw machine, two milling machines, one universal grinder, two drill presses, and one punch press. The equipment of grinders, vises, fixtures, and attachments is ample.

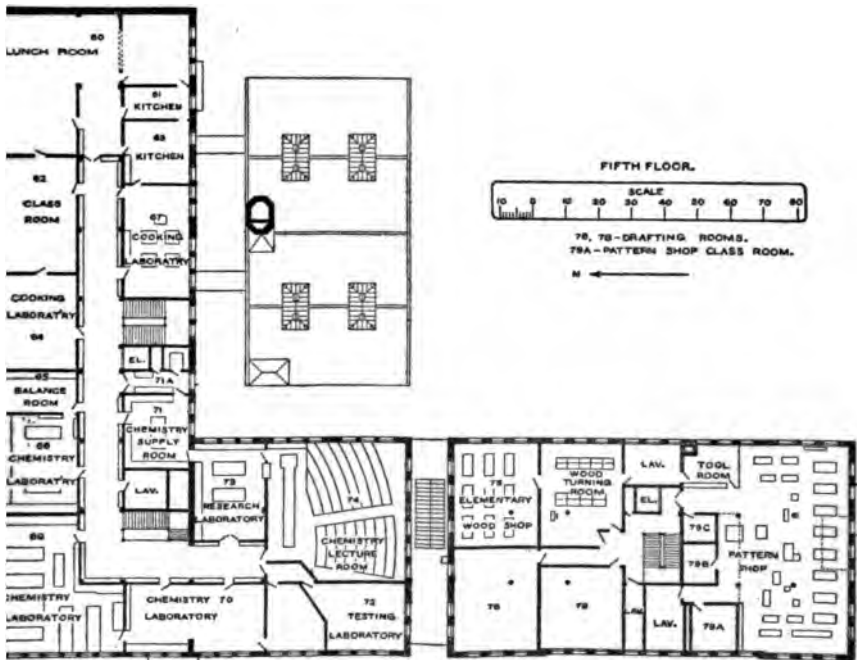


Machines are driven by individual motors. A one-tone, hand-power traveling crane commands the erecting floor and the larger machines. A class-room is in connection.

The elementary machine shop contains thirteen engine lathes and two speed lathes, two shapers, one milling machine, one drill press, and one emery grinder. Classes of sixteen students can be accommodated.

The tool room is situated between the two machine shops, and contains a lathe arranged for tool making, a special tool grinder, and a cutting-off machine. Here are kept stock, tools and fixtures. Tools are issued on check.

The chemistry lecture room which seats 200, and laboratories for the Department of Chemistry and Domestic Science, are located on the fifth floor. Here too is the kitchen and lunchroom, in which meals are served for the cooking class. The fifth floor of the Engineering Building contains the woodworking and drafting rooms.



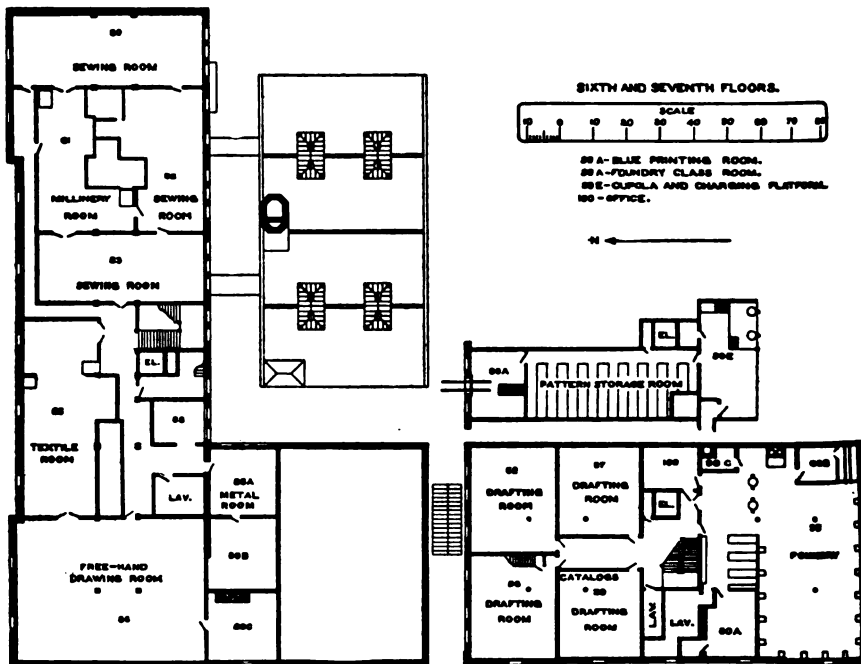
The pattern shop is equipped to accommodate sixteen students at the benches at one time. Wood lathes, a planer, a circular saw, a band saw, and other machines, with the necessary hand tools, are found here. A tool-room, a dry kiln, a room for unfinished work, and a class-room open from the shop.

The elementary wood shop accommodates classes of eighteen students. It is arranged for hand work only.

The wood turning shop adjoins the elementary wood shop. It contains eighteen wood lathes and the necessary accessories.

The sixth floor on the Madison street side contains the rooms for sewing, millinery, and free hand drawing and design. In the Engineering Building are the foundry and the drafting room.

The foundry is arranged for a class of sixteen students. In the equipment are a sixteen-inch cupola, a twenty-four-inch cupola, two brass furnaces, two core ovens, a tumbling barrel, and a



one-ton traveling crane. A class-room, a core-room, and a pattern store-room open from the foundry.

Four drawing rooms, one arranged especially for sketching and three for mechanical drawing, are also situated on this floor. Each room is arranged to accommodate twenty students. A blue printing room is in connection.

Students in Attendance

(1910-1911)

The names of students taking evening or summer courses are not included in these lists.

The figures after the names of college students indicate the number of courses of instruction completed without conditions at the close of the year ending in August, 1911, above and beyond the fifteen admission units.

College Students—Men

Adams, Thomas Rowan	26	Frydendall, Archie Danforth.	26
Ahrens, Walter Robert.....	45	Gaba, Maurice	10
Anderson, Andrew J. A.....	12	Gamble, Merritt Campbell..	15
Bacon, Malcolm.....	36	Garner, William Courtney...	
Bagby, Robert Bartlett.....	8	Garrison, John Lee.....	
Baker, George W.....	32	Gerwig, Harry Knowles.....	12
Balocca, Fred S.....		Goit, Laurance Edward.....	10
Bartik, Charles	20	Goldkette, John	
Biesemeier, Robert Frederick	25	Golinkin, George Bernard...	15
Bilek, Joseph	8	Hildebrandt, George	34
Blatchford, John	24	Hill, Nathaniel	12
Block, Abraham Moses....		Hiller, Ernest T.....	12
Brauer, Gustav A.....		Ho, Suy Chung.....	14
Bronson, Clifford B.....	28	Johnson, George Lester....	32
Burke, Henry James.....	45	Jones, Herbert Milton.....	
Bush, George C.....	44	Jones, Charles Milton.....	
Carlson, Harry Joseph.....	10	Kane, Paul	45
Carlson, Martin A. W.....	6	Kazda, Charles Bohumel....	24
Chowdhurry, Kaelas C. D...		Kennedy, Robert Eaker....	
Cochran, Ernest John.....		Kester, Lawrence Warington	9
Corliss, Lester John.....	18	Klamt, Edward	38
Crawford, John Edward....		Klein, William Frederick...	43
Crighton, James Miller....	8	Knight, Leaf Cort.....	5
Dame, Louis	3	Korshak, Charles	
David, Walter Woodbury....	8	Kuchynka, Julius V.....	6
Deihl, Orma Ralph.....		Lampert, Henry Herman....	20
Dempsey, Ewald	32	Larsen, Elmer Carl.....	30
Dernbach, William Adam...		Larsen, Lester Reginald....	24
De Souchet, William Osman.	9	Leman, Edwin D.....	30
Dickinson, Fred W.....	27	Lilley, Orrin Alpheus.....	21
Donaldson, J. Crawford....	32	Loeding, George	30
Duffy, Joseph Lawrence....	6	Loven, Walter John.....	36
Edwards, Lester Richard....	32	Luhnow, Walter Frederick..	8
Eger, Wells		McGrath, John Dally.....	38
Epstein, Albert	18	McKay, Stuart	
Ettinger, Wallace John.....	9	McKee, Eustin Ewart.....	10
Feeley, Frank Joseph	42	Messier, Valois Elwyn.....	8
Fenoughty, George Bernard.		Mickelsen, George James....	8
Fensholt, Adolph C. H.....	24	Mitchell, Ralph Allen.....	
Forster, Henry	45	Moore, Charles Henry.....	15

Moore, George R.....		Smith, Gerald Clark.....	
Obergfell, Ralph Marshall..	45	Smith, John Parker.....	3
Pardee, Theron	38	South, Donald Corbley.....	8
Petersen, Theo. Waldemar..	26	Spies, Philip Matthew.....	17
Peterson, Harvey Emanuel..	36	Stoll, Walter	18
Pontious, Walter William...		Strauss, Edward Emil.....	40
Porter, Edwin Margraff.....	6	Sumkowski, Alfons J.....	28
Rabens, Isidore	18	Supple, Lee Francis.....	19
Reger, John E.....	37	Tarracciano, Alexander	9
Reisenhus, James Arthur...	37	Tehle, Charles John.....	10
Rubenstein, Nathan	18	Titus, Harold Earle.....	4
Rundell, Richard E.....		Travis, Lawrence LeValley..	19
Russell, John Albert.....		Troyke, Louis	6
Ryan, Lawrence	18	Turner, Charles Arthur.....	9
Salisbury, Howard Darius...	19	Turner, Claire Brown.....	
Schaedel, Victor Amos.....	32	Waise, Sidney William.....	17
Shalek, Kenneth Peter.....	6	Wise, Frank John.....	9
Sherman, Parsi Ram.....		Wong, Chin Wing.....	
Shewmon, Dan D.....	36	Wyman, Laurence West....	44
Shirk, Donald Raymond....	9	Zielaskowski, Frank	12
Simonson, Guy Lorraine....	10	Zitzewitz, Walter	37
Skiles, Frank Chambers....		Zuckerman, William	
Small, Elmer Stiles.....	42		

College Students—Women

Abrahamson, Amy Bertha...	10	Clark, Verde Alice.....	10
Ackley, Helen	10	Coggeshall, Ruth	
Alles, Alma Margaret.....		Collins, Jean	12
Austin, Alice L.....	6	Collins, Ruth Miriam.....	19
Austin, Eva Marie.....	20	Connell, Elizabeth	11
Babcock, Edna		Connell, Marguerite	
Balfour, Jessie Scott.....	9	Cornwisher, Rosa	6
Ballard, Bertha May.....	9	Costello, Maude Marie.....	19
Barker, Hazel Louise		Costello, Ruth	10
Bassett, Gertrude	13	Cox, Jessie	6
Batchelor, Gertrude H....	19	Coyne, Kathryn	10
Bennett, Antoinette Adelaide	7	Croake, Frances	19
Bernstein, Esther	18	Cunning, Edna	9
Blezinger, Helen Ruth	9	Davis, Dorothy	8
Borcherdt, Juanita Carrie...	10	Decker, Anna Frances.....	26
Bradford, Jessie		DeLagneau, Lea R.....	
Bramhall, Elizabeth Winifred	5	Dincher, Grace Kathryn....	20
Brand, Edna	6	Druitt, Edith	9
Brazelton, Marlon Frances..	12	Duff, Mildred	3
Brown, Lillian Bon Roe....	5	Ellsberry, Palmer Ready....	19
Burr, Lucy	10	Engelhard, Dorothy	
Butler, Dorothy	2	Estabrook, Shirley	10
Butler, Mabel.....		Falls, Marion Zella.....	10
Calderwood, Florence	6	Felt, Winifred	27
Campbell, Ada Estelle.....	22	Ferguson, Elizabeth	
Canaday, Alice Creighton...	18	Fischer, Frances Julia.....	19
Canaday, Sophia Matilda....	18	Fitzgerald, Mildred	9
Carey, Elizabeth	9	Fitzmaurice, Blanche	14
Carey, Kathleen.....	18	Fleming, Anna Wills.....	7
Carter, Mabel Harriet.....	10	Flyke, Marie Winifred.....	9

STUDENTS IN ATTENDANCE

67

Foley, Annie	14	Mather, Ruth	19
Furlong, Mary Elizabeth.....	19	McBride, Marguerite.....	6
Gardner, Prudence Charlotte. 12		McGann, Mary Elizabeth....	10
Gibbons, Mary Elizabeth B. 18		McGarry, Grace Margaret...	10
Gilgis, Marie	4	McLaughlin, Frances Marion	19
Gleason, Edna Gertrude.....	10	McManus, Grace	20
Gleason, Pauline	29	Meadows, Louise Ann.....	7
Glickman, Cella	11	Melick, Isabel	10
Goldberg, Minnie	12	Meyer, Katherine Frederica..	20
Gould, Helen	18	More, Elizabeth	10
Grant, Louise Ray	18	Moss, Zola	3
Grassley, Florence Olmstead. 19		Nagl, Marie	27
Griswold, Florence Marg'rite 19		Nagle, Susanna	10
Gurney, Irene	2	Neville, May	19
Hammon, Hildegard K'hls'at 4		Niederman, Malvina Dorothy	18
Hanawalt, Grace	10	Nieman, Florence May.....	
Hancock, Franc Berry.....	28	Nixson, Bertha Louise.....	19
Hanlon, Berenice		Nohren, Lila Leone.....	10
Hannan, Helen Adelaide....	26	Northey, Mary Holbrook....	9
Harris, Mrs. F. G.....		Nuese, Freida Carolyn.....	19
Hartmann, Anna	10	O'Melia, Margaret	8
Hartsburg, Frances Mabel..	20	Orr, Lillian Gertrude.....	
Hatch, Louise	20	Palmer, Ina Frances.....	5
Hautau, Emma	29	Paulk, Marie Lucinda.....	19
Henderson, Ruth	19	Periolat, Mrs. Katherine....	
Hickey, Loretto Agnes.....	7	Peterson, Edith Louise.....	4
Hill, Grace	6	Phelan, Margaret	18
Hinkley, Elsie Earle	10	Pierce, Cornelia	30
Hoffman, Annetta Jane.....	10	Piety, Ruth Elizabeth.....	9
Hoffman, Elizabeth J.....	7	Porter, Sarah	17
Hogle, Imogene Mary.....	4	Putney, Emma Marion.....	13
Holmes, Mary	9	Rae, Nellie Wells.....	9
Hood, Ethel May.....	19	Reed, Lietta	10
Hood, Helen Esther.....	10	Reed, Ruth	9
Howe, Amy	21	Roberts, Dorothy Bradley... 27	
Hett, Marie	18	Robertson, Elizabeth Wells..	
Jones, Elta	11	Roe, Elizabeth	10
Jones, Myra Louise.....	10	Rohn, Cora	2
Jordan, Edith	10	Ronshausen, Clara	17
Kaufmann, Mrs. Mollie.....		Rosenstein, Rose	10
Kelley, Emily	6	Ross, Sadie Elizabeth.....	10
Kelly, Frances	19	Roth, Anna Maria.....	10
Kibler, Mattie Vernon.....		Roth, Helen	22
Kimbell, Elizabeth Maria....	18	Routledge, Goldy M.....	6
Klausner, Rose		Ruediger, Clara	18
Koop, Elsa		Sawyer, Edna Clark.....	9
Kramer, Gertrude	11	Schock, Natalie	
Kruger, Ada Rowena	33	Schole, Bonnie Elizabeth....	20
Lakin, Frances Josephine... 9		Schreiner, Caroline	3
Lange, Caroline Louise.....	19	Schutz, Dorothy Leah.....	15
Leverenz, Amanda	10	Scott, Irene Leona	4
Levin, Helen	6	Shank, Dorothy Esther.....	8
Livingston, Katherine	20	Simpson, Helen Shirley....	10
Lower, Lotta		Skinner, Mrs. Estelle	10
MacKinley, Marguerite	10	Smith, Elizabeth Elvira.....	20
Mallon, Marguerite	19	Snyder, Hazel.....	10
Mangan, Hazel Grace.....	19	Southwick, Elizabeth A....	18
Massoney, Mrs. Delphine....		Stoddard, Hazel.....	19

Stokes, Edith Ellen.....	9	Wallace, Maude Emma.....	19
Stoltenberg, Dora.....		Wathier, Ethel M.....	10
Stronach, Linnie Viola.....	20	Watson, Christine Mae.....	10
Talcott, Sylvia.....	8	Werno, Henrietta Anna....	10
Taylor, Mary Elizabeth....	4	White, Grace Charlotte....	10
Taylor, Vianna.....	2	White, Margaret Jean.....	
Tennison, Clara Anna.....	10	Wickman, Gertrude Edith..	8
Thjomoe, Marguerite Patri-		Wilder, Faustine Loranda....	8
cia	8	Williams, Eva	10
Thompson, Celia Dorothy...	10	Williams, Grace Louise....	19
Tierney, Zita.....		Williams, Jeanette Agnew..	19
Tonnesen, Louise.....	18	Williams, Margaret Florence	18
Tonson, Gertrude.....	6	Wilson, Agnes Costin.....	19
Turnbull, Eve Elizabeth....	10	Wilson Corinne Lee.....	13
Turner, Lucille.....	10	Winkleman, Laura M.....	19
Van Winkle, Helen Blodgett	9	Wood, Dorothy Moores....	10
Walker, Edna Wells.....	9	Wood, Veda Palmer.....	
Wallace, Esther Wiley.....	9	Wyllie, Ethel E.....	3
Wallace, Mayette Shepard..	10	Zimmerman, Irene Mehrhoff	18

Academy Students—Boys

The figures after the names indicate the number of units completed at the close of the year ending in August, 1911. For definition of unit, see page 12.

Abbott, Lawrence Howard..	12	Bischmann, Otto August....	15
Abbott, Robert Edward....	6	Bjorklund, Wallace	4
Ackermann, Charles Edward	9	Blanding, George Harvey....	15
Aiken, James Marshall....	7	Block, Louis Daniel.....	2
Algots, Mortimer Gustav....	5	Block, Louis Herman.....	10
Allan, James Ramsay.....	15	Bloss, William	7
Ammentorp, Geo. Christian.	12	Borne, Henry Joseph, Jr....	2
Anderson, Hilding Adolph..	2	Bradish, Lee Paul.....	2
Anderson, LeRoy Christ....	15	Brand, William Otto.....	8
Archer, Wilbur Cross.....	8	Breckan, Harris	15
Armkecht, Bruno Thomas..	3	Bredfeldt, Harry	3
Armonda, John Aloysius....	2	Bremner, Robert S.....	3
Arnold, Stanley R.....	10	Brett, Arno Lawrence.....	7
Ashelby, Elmer M.....	8	Breyer Chas. Conrad, Jr....	11
Atkinson, Gustav Em'n'l, Jr.	7	Briggs, Jack W.....	7
Augensen, Alfred	8	Brill, David	3
Ballard, Edward Milton....	3	Bromm, William	7
Barker, Charles M.....	3	Bron, Grovert Harry.....	8
Barler, Richard Candon....	15	Brown, Cecil Aunger.....	15
Barrow, Walter John.....	4	Bruns, Herman Edward....	4
Bartelme, Clarence Michael.	12	Butler, Julius Wales.....	4
Bartelt, Winam	15	Caldwell, Millet Benton....	13
Bartizal, John Frank.....	4	Campbell, Stuart MacMurray	11
Bates, John Michael.....	12	Cann, LeRoy Raymond.....	11
Baudoin, Louis Arthur.....		Caplan, Louis D.....	11
Bauman, Albert Lester....	6	Carden, Joseph John.....	3
Becker, Leslie Willard....	12	Carr, Howard	9
Behrens, Paul Ellsworth....	11	Chamberlain, Klee Arthur..	7
Benson, Harry Cassidy....		Chamberlain, Paul Wheelock.	11
Benzo, Harry August.....	4	Chan, Hing Wan.....	11
Bernbrock, Merrill LeRoy..	5	Childs, Leslie Oliver.....	15
Berthold, Leo Frederick....		Chmelik, Frank Joseph....	7
Bigley, Hannibal A. L.....	3	Churton, Victor William....	11
Binch, Abraham	3	Clark, Leonard Dudley.....	11

STUDENTS IN ATTENDANCE

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Walter Fred.....	16	Freyer, Dirk S.....	16
ran, Harry Symonds...		Fredenhagen, Donald Eugene	4
le, Robert W.....		Freeto, Frank Harmon.....	8
well, Richard F.....		Freeto, Robert Everett.....	7
Philip Daniel.....	4	Frisbie, Charles Samuel....	2
lt, Harold Scribner....	15	Fuerst Philip	7
rti, Benjamin Martin..		Fyfe, Robert Wiedling.....	4
ers, Roy		Galloway, John Leon.....	
Querin Henry.....	15	Gamble, Richard Cotter....	8
y, Arthur Brandt.....		Gardner, John Frank.....	11
bs, Robert Arthur.....	4	Gardner, George Hereth....	3
er, Donald Carlisle....	6	Genslein, William Gustave..	17
Arthur	15	Gnaedinger, Robert Joseph..	8
on, Helge Rudolph....	15	Golden, Howard	15
er, Henry August.....	8	Goodall, Thomas Jefferson..	15
, Carl, Jr.....	13	Goodman, Alex	
ingham, Allan David...	3	Gordon, Albert	11
, Clarence Rhea.....	7	Granert, William	4
, Edgar Alfred.....	4	Graves, Esek Bursey.....	4
e, Frank Harry.....	4	Grimshaw, Worrell	4
er, Max	15	Gronberg, Adolph Fred'rick.	6
, Anker George.....	5	Grover, Lyman Hamilton....	10
r, Arthur		Gurdes, Fred Alfred.....	4
son, Bruce Jordan....	15	Haleff, Max	5
, James C., Jr.....	3	Hall, Howard Gage.....	6
on, Charles Marshall..	4	Hart, John Vincent.....	3
l, Benjamin Albert...		Hartung, George William, Jr.	
s, William Clark.....		Hassler, Frank Rogers.....	4
r, Edward Hoadley....	2	Hausam, George W., Jr.....	
y, Lyman R.....	3	Hazelton, Frank Benjamin..	12
rsky, Maurice D.....	9	Heffron, Arthur D.....	15
o, James Ballard.....	10	Heltzman, Walter Conrad...	4
ski, Edwin	6	Herdig, Leo George.....	4
r, Wesley H. E.....	7	Herlofson, Clarence	15
Russell A.....	3	Herrick, Paul Howden	11
, Hugh Gates.....	4	Hildebrandt, Edward J.....	17
er, James Byron.....	15	Hirsch, Armie	9
lman, William Harold..	15	Hobler, Fred Otto.....	15
Jean Jerome.....	3	Hokin, Harry Reginald.....	
, Arthur	15	Hollister, Lloyd Frank....	6
am, Murray	2	Honig, Edward Charles....	6
zzi, Conrad Joseph....	2	Hoppe, Adam	4
am, Frank F.....	2	Horrobin, William Taylor...	9
Edward William.....	2	Hough, Tom Edwards.....	15
erstone, George Frances	10	Howe, Carleton	
erstone, Raym'd McKay	10	Howe, Lawrence Elmer.....	3
, Paul John.....	4	Hoyt, Benjamin Frank.....	5
e, Joseph	15	Hudler, Alfred Henry.....	4
olt, Otto Bernhard....	7	Hughes, Ernest Victor.....	
Oliver Eugene.....	5	Hulbert, Francis Clinton...	
d, William Lawrence..	3	Huszagh, Kenneth Arthur...	15
ng, Andrew Edward..	8	Jacky, Philip John.....	10
Albert Lincoln.....		Jacobs, Walter Fred.....	4
Harry John, Jr.....		Jaffe, Joseph	16
, John Harris.....	8	Jaffke, Walter William....	
, Irwin Allen.....	8	Jarvis, Rowling	17
, Willard James.....	8	Jean, Wing	4
isco, Lewis Mercer....	17	Jeschke, Robert Henry.....	2

Johnsen, Humbert T.....	3	Luhnnow, Harold	8
Johnson, Forrest		Lyon, George Loder.....	15
Johnson, James Lawrence..	15	Mable, Don C.....	13
Johnson, Reuben	5	MacDougall, Roland Baird..	
Johnson, Elmer Roy.....	8	MacIsaac, Donald	7
Johnson, William Geel....	6	MacPherson, William John..	17
Johnstone, Walter Knox....	15	Macy, Lewis Anthony.....	11
Jones, Alfred Edward.....		Magerstadt, Edmund William	8
Jones, Stephen Barrett....	12	Magnuson, Albert Carl.....	
Kaeding, George L.....	3	Malmros, Charles Niles....	
Kamfner, Joseph	15	Marks, Arnold	7
Kasturske, Stanley	3	Martens, Harold Henry.....	8
Keefe, Harold Edward.....		Massey, Floyd John.....	
Keenan, John Aloysius.....		Matejka, Frank	2
Kehm, Walter Gilbert.....	15	McClanahan, Bayard Glenn..	11
Kell, Harold Wesley.....	11	McCullough, Roger Moore... 5	
Kemnitz, Henry	10	McCullough, William Raym'd	
Kennedy, James Francis....	4	McCune, Perry Edwards....	12
Kesling, George Hans.....	11	McDonald, Eugene Gerner..	
Kleinbeck, Herbert		McDonald, John Arthur....	17
Knopf, John Daniel.....	5	McGill, Graham St. Clair... 11	
Koller, Zdenek	3	McGuire, Thomas Browne..	11
Korthals, Andrew Leonard..	7	McLennan, John B.....	11
Kovarik, Edward John.....	6	McMahon, James Alan.....	15
Kraft, Jacob Theodore.....		McNeal, Harold Edwin.....	12
Kral, Frank Edward.....		Meidinger, Harold.....	10
Kroeschell, Carl Herman... 14		Meiling, Carl Gustav.....	6
Kroeschell, Paul Herman... 15		Meinung, Richard, Jr.....	3
Krum, George Adelbert.....	3	Meltzer, Arthur Louis.....	4
Kuhnen, Karl Peter.....	3	Mikkelsen, Robert	15
Kuhnen, George Proctor....	8	Millar, Frank Washington..	9
Kupfer, Charles Adam.....	4	Miller, Benjamin Harry....	13
Kuratko, John, Jr.....	3	Minch, Arnold John.....	12
Kwiatkoski, Frank Joseph... 3		Minchin, Sidney	15
Lamond, Roy Douglas.....	8	Misch, Harry	13
Landon, Thomas Ellsworth..	5	Mock, Frank Xavier.....	7
Lane, James Warren.....	15	Monahan, Charles Laurence.	4
Lang, Henry Adolph.....	8	Monson, Alvin O., Jr.....	5
Lange, Hugo Frederick.....	5	Moore, Charles Edward....	4
Lange, Salvatore	12	Moore, Frederick Paul.....	3
Larkin, Thomas Boyer.....	6	Moore, Marlin	17
La Shonse, Clarence Leo...		Morand, Lester Joseph.....	2
Latham, Boyd Wesley.....		Morgan, Thomas J.....	12
Leggett, Richard Heywood..	2	Moss, Nathan Joseph	4
Leitner, Charles B.....		Moulton, Wesley Hilton....	13
Lesser, Samuel	8	Mouns, Albert Ledden.....	10
Levin, Charles	12	Mueller, Oscar Carl.....	10
Levin, Jack	4	Mueller, Herbert Edward... 15	
Lichter, John Paul.....	15	Mueller, Theodore Louis... 12	
Lidster, Homer Edward....	7	Murdock, James Nelson....	4
Liese, Henry Albert.....	11	Murphy, Howard Dawson....	13
Lifschitz, Jacob	10	Naiman, Julius	
Lifschitz, Meyer	3	Nelson, Arthur William....	15
Lindquist, Arthur Joseph... 9		Nelson, Carl Frederick.....	5
Linn, Sue Shing.....	9	Newell, Laurence Plympton. 12	
Lovett, William	8	Nickelson, Walter	4
Ludwigs, Arthur Charles... 12		Nielsen, Elker Rosehill....	9
Luhnnow, Elmer Christian... 15		Niemann, Edwin Henry.....	8

STUDENTS IN ATTENDANCE

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o, Rocco	12	Saracino, John David.....	3
as, George Jacob.....	4	Sauer, Joseph	12
n, Edmund	7	Savage, George Edward.....	16
ard, Paul	8	Saxon, William J.....	2
cki, John	3	Scheppach, George Sheldon..	4
naier, Joseph	7	Schintz, Walter Schager....	
en, James Chalmers...	9	Schmidt, Leo	4
en, Jas. Christopher, Jr.	7	Schumacher, Arthur	17
ner, Leon Phillip.....	5	Schweizer, Eugene Peter....	5
nell, James George, Jr.	3	Schwinn, Frank	8
n, David Batchelder....	9	Scott, William Blair, Jr....	5
a, Frank Edmund.....	8	Scully, Raymond Peter.....	
ra, Reaburn James.....	4	Seaborg, Clarence Olof.....	6
ll, Eugene	16	Seaberg, Grover Ernest.....	6
ller, Louis H.....		Seaberg, Raymond Walter...	4
ig, Feodore Henry.....		Seellig, Lester	4
er, Walter	15	Selter, Casson Walter.....	14
r, Charles Jaeger.....	15	Seligman, Samuel	15
nd, Jacob	13	Shaw, Harold Erskine.....	7
rson, Emery Jerome....	11	Shea, Thomas Francis.....	7
, Eugene Sidney.....	3	Shearman, Arthur C.....	6
, Clarke Demorest.....	13	Sherman, John King.....	10
sen, Arthur A.....	11	Shonka, Robert Ralph.....	
sen, Louis Andrew.....	12	Shopera, Henry Nathan....	16
sen, Robert Peter.....	12	Siegel, David	11
son, Arvid Ragner L....	15	Sikorski, William Albert....	3
er, Frank Henry.....	4	Silverman, Meyer Joy.....	16
ps, Harvey	7	Simonek, Bedrich K.....	
r, Arthur Robert.....	6	Simonek, Frederick Ludwig..	2
ndon, William N.....	8	Skinner, Edward Ainsworth..	10
, John Lewis, Jr.....	12	Sladek, Edward Frank.....	12
ca, Laddie	4	Sladek, Robert Bohumil....	4
roy, Dan Bellamy.....	5	Slater, Benjamin Fred.....	3
Edwin	8	Slocum, Caryl Hopkins.....	15
, Dominick	11	Slocum, Charles E.....	
gal, Henry Salvatore...	4	Slotkovitz, Edward H.....	4
Mun Seum.....	9	Smith, Charles	12
Horace Charles.....	5	Smith, Clarence Philip.....	15
ill, Ellsworth B.....	7	Smith, Kenneth Hamilton...	
n, Ray Emerson.....	15	Smith, Oren Elliott.....	10
Frank Carl, Jr.....	7	Smith, Robert West.....	
Joel Earl.....	9	Soderstrom, Axel	
z, Arthur W.....	2	Sohn, Ludwig	
ardt, Charles Henry...	15	Sorensen, Carl	17
olds, Clarence Clarke..	5	Stehlik, William James.....	6
Burton	5	Steinert, Rolland Theodore..	6
rds, Marmet Austin....	15	Stephens, Ernest Melville...	15
a, Samuel	3	Stephenson, Guy	10
son, Raymond Dudley..	15	Stern, Mortimer	2
astle, Urban John.....		Steuer, Joseph True.....	16
son, Everett Edward....	13	Stevenson, Robert David....	16
wald, Edward		Stevenson, Warren Lester...	6
Walter Sherman.....	11	Stewart, George Ross.....	15
ll, Edward Gordon....	11	Stiles, Norman Camp.....	3
tt, George Wilbur.....	15	Stirton, James	15
ll, Enoch	11	Stokes, Arthur Frederick....	15
rs, Carl	12	Stone, Joseph Leonard.....	7
rs, Henry August.....	17	Strauss, Benjamin Herman..	

Street, John A., Jr.....	10	Wallen, Archie Welling.....	4
Strickland, Robert Tiras....	15	Walz, Albert Joseph.....	11
Stucker, Urban Lucas.....	15	Warneke, Edward L.....	
Sturges, Frank, Jr.....	11	Warwick, Orville H.....	3
Sullivan, Desmond Thomas..	16	Wathier, Lionel Joseph.....	10
Sundheim, George.....	5	Weber, Stanley Charles.....	4
Supple, Omer Edmund.....	15	Weekes, Robert William....	8
Suttle, Frank.....	6	Weil, Leo James.....	9
Swanson, Arthur.....		Weil, Martin.....	11
Swets, Leroy Warren A.....		Weinberg, Benjamin.....	12
Sword, Theodore.....	16	Weis, William Francis.....	15
Tate, Byron Day.....		Wessman, Frank Raymond..	
Tauber, William.....	5	Westen, William H.....	6
Taylor, Darwin.....	9	Westlund, Victor Siegfried..	
Taylor, Forrest Charles.....	10	Whelan, Mitchell Joseph....	5
Tearney, Cyrus Joseph.....	3	Whiting, Clifford Carpenter.	9
Thelin, Eric Blaine.....	7	Whitley, Ralph S.....	7
Theobald, William.....	8	Widmann, Frank Theodore..	3
Thielman, Harry.....	6	Willey, Raymond Shakleford	
Thoma, Clarence Fink.....		Williams, Lyman Wallace... 11	
Thomas, Edwin Benjamin... 16		Wilson, James Bell.....	11
Thompson, Carter Borland... 2		Wilson, Klaburn.....	5
Thorpe, William Fredetick.. 15		Wilson, Stuart James.....	12
Toban, Frank.....	10	Wing, Judson Ralph.....	12
Toban, Richard.....	8	Wolff, Rudolph.....	6
Tolosana, Angelo.....		Wolfson, Max.....	
Toy, Wing.....	4	Woodworth, Paul Merrilless.	7
Triebull, Erwin Fred.....	8	Wray, Arthur Thomas.....	6
Tutt, Herbert Francis.....	12	Wright, Fred L.....	3
Tweddle, Thomas Park.... 5		Yen, King Lau.....	
VanEtta, James.....		Young, George Bright, Jr....	
Vastine, Sherman Sedgwick. 2		Zabel, Max Otto L.....	
Vavrinek, Edward Joseph.... 15		Zierau, Niels.....	9
Venne, Joseph Bernard.....		Zimmerling, Raymond Oscar. 3	
Von Pein, Milton.....	10	Zoellin, Frederick Johnston.	
Voss, Irving Joe.....	3	Zuckerman, Nathan.....	
Waldschmidt, Arthur Amos. 5			

Academy Students — Girls

Abersson, Mrs. Esther.....		Baudoin, Mrs. L. A.....	
Adslit, Isla Geneva.....	7	Baumgartner, June.....	10
Ahlswede, Ruth.....	11	Beattie, Gladys.....	15
Alsip, Hazel.....	4	Becker, Augustina Irma....	6
Alsip, Ruth.....	11	Becker, Minnie.....	3
Alsip, Ruth K.....	3	Bernstein, Ethelyn.....	
Andren, Olga Amalia.....	15	Bliven, Emma May.....	
Archibald, Virginia.....	8	Blonder, Gertrude Blanche..	3
Arduesser, Marguerite.....	9	Bolger, Mayme Esther.....	8
Baethke, Irene Amelia.... 4		Bond, Marie.....	13
Baldwin, Edith Myrtle.....		Brannum, Marjorie.....	8
Ballard, Mary Esther.....	15	Breyer, Hazel.....	15
Bankes, Mabel Hester.....	8	Brown, Marjorie.....	
Baragwanath, Cecil.....	11	Brown, Ruth Elizabeth.....	3
Baragwanath, Ruth Emily... 15		Carr, Emma.....	9
Baskind, Tillie Anna.....	4	Carroll, Martha Beaumont...	

Almina	8	Hartmann, Helen	15
herty, Grace	9	Hawkshaw, Madeline	2
herty, Hazel Marie.....	7	Heffron, Helen	15
berlain, Elizabeth	10	Henderson, Ethel Helen.....	6
s, Majorie Lucille.....	7	Herdrich, Adella	
, Helen Lorinda.....		Herlofson, Dora	6
n, Lily	8	Hoffman, Lucille Victoria... 4	
Alice Belle.....	3	Hollatz, Carrie Bertha.....	7
Marion	2	Hollingshead, Harriet	3
in, Sylvia	15	Holmer, Mabel Lucille.....	
ford, Regina	4	Holz, Marie W.....	
s, Ruth	15	Howe, Irene Gladys.....	5
ck, Anna Josephine.....		Howe, Elizabeth Ruth.....	15
lson, Carol Adeline.....	8	Hufmeyer, Della Matilda....	8
i, Helen	11	Huth, Gertrude	12
e, Edna	5	Hett, Dorothy	15
Dorothy	15	Irwin, Mildred	10
Gladys De Vere.....	8	Jevne, Verna Alice.....	15
nd, Ruth	10	Jicha, Anna May.....	7
ins, Virgil.....		John, Margaret	12
e, Irene Emily.....	15	Johnson, Anna	5
s, Hedwig	15	Johnson, Georgia Leigh....	10
, Lucy	15	Jones, Frances	5
ar, Bessie	6	June, Ethel	7
k, Vlasta	4	Kalish, Miriam	3
rt, Georgia Grosvenor..	8	Keegan, Alice	7
nan, Mrs. Lornetto....	6	Kelly, Lucile Irene.....	15
rton, Pauline Wilson....	15	Kimmet, Olive M.....	11
rt, Louise		Kinsey, Hope Maud.....	8
ardt, Edna Sophia.....	12	Klawans, Sylvia Rose.....	4
ardt, Erna Columbia....	5	Klehr, Antoinette	3
Laura Louise.....	4	Klein, Lillian	3
lding, Matilda	7	Klicka, Helen	4
tti, Gertrude Martha... 4		Klimt, Mabel	3
, Mamie	9	Klingel, Susanne Marie.....	8
Caroline	6	Kobzina, Libbie Lily.....	6
ell, Grace Eleanor.....		Kolacek, Cecilia	4
Ethel Addie.....	12	Kool, Doris Elaine.....	15
Sophie		Kool, Vera Mae.....	15
m, Vinca	11	Korup, Bertha	12
er, Dorothy	4	Krafft, Edna	5
Esther	5	Kreitzer, Edna	
r, Frances	8	Krogman, Lily	4
Adelaide	9	Lammert, Olive Madeline... 15	
r, Marie	14	Lane, Marguerite Grace.....	2
on, Margaret Emily.....		Lane, Marie Ruth.....	11
rt, Marilla Phipps.....		Lang, Kathrin	15
er, Charlotte Catherine.		Langdon, Beulah	8
off, Theresa	9	Langelund, Lillian	
berg, Sadie	3	Langendorf, Lena	
ert, Florence Viola.....	7	LeMoon, Alice N.....	3
, Marian Ethel.....	15	Lerch, Helen Adele.....	8
, Ruby	10	Lichtenstadt, Dora Josephine 12	
nfield, Helen	3	Lucchesi, Louise	5
t, Grace Elizabeth.....	6	Luce, Marion Day.....	13
t, Jennie		Lund, Ethel Aradena.....	4
r, Henrietta Louise....	6	Luther, Gladys	
erin, Mrs. A. N.....		MacIsaac, Dorothy	10

Madsen, Ruby Celia.....	1	Richardson, Helen	10
Magnus, Marie	15	Riddiford, Ruby	4
Magnus, Mathilda	3	Rittenberg, Luba	
Mankowitz, Alice		Roeschlaub, Genevieve Sharer	15
Mann, Marjorie Ridpath.....	13	Rogers, Lillian Alda.....	10
Marnell, Catherine	12	Roos, Dora	7
Matthews, Marvel		Rubel, Florence Nancy.....	10
May, Mildred Teresa.....	8	Russell, Nellie	
McCann, Elizabeth C.....	7	Scanlan, Bessie Rose.....	3
McChesney, Alice Anna.....	12	Simons, Rose	10
McClanahan, Alice May.....	15	Slater, Adeline Margaret....	12
McGuire, Martha Browne....	11	Smith, Hazel	
McKee, Ruth Cruthers.....		Smith, Helen	15
McKee, Selina Augusta.....	15	Smith, Leila Bey.....	8
Michael, Esther Marjorie....	3	Spiehr, Enola Segrid.....	12
Mokkelbost, Blanche	15	Steinhauser, Marie	3
Moran, Winifred Helen.....	13	Stewart, Gladys Price.....	13
Morris, Helen	15	Strassheim, Irma Marie....	6
Morris, Edna Pauline.....	8	Sweet, Ramona Cora	
Nachtway, Gertrude	12	Szymanski, Cornelia	3
Neeley, Anna Louise.....	8	Terwilliger, Irene Beatrice..	7
Nordahl, Evelyn	12	Terwilliger, Louise Evaline..	8
Norris, Katherine	15	Thomas, Gertrude White....	
Nowak, Rose Harriet.....	15	Titus, Virginia	15
Olcese, Stella		Tope, Mary Jane.....	
Olesen, Marie Georgine.....	15	Trent, Anna	
Otto, Emelia Isla.....	3	Vermaas, Anita Marie.....	4
Parks, Dora Ruth.....		Voelcker, Florence Hazel....	
Parmenter, Blanche Minette.	9	Von der Lehr, Florence H...	
Parsley, Mammie Nutt.....	10	Walduck, Lorna	10
Patterson, Helen Martha....	9	Warder, Elsie Evelyn.....	5
Percy, Bernese	11	Warloe, Luinor	15
Perlstein, Mamie	4	Wathier, Clarisse Florentine.	10
Pilat, Gertrude Helen.....	12	Wathier, Helen Adelaide....	3
Pinkert, Martha	8	Webster, Ruth Violet.....	4
Porter, Ella	15	Weesies, Ruth	3
Prendergast, Constance Vera	7	Wiegand, Gertrude Margaret	4
Rand, Esther	3	Wiener, Hildegard	15
Ransom, Marjorie	7	Wiener, Ingeborg	3
Raymer, Ellen May.....	11	Wilk, Jennie	4
Rayner, Frances Jane.....	3	Williamson, Alice Evangeline	
Red, Esther	15	Woltersdorf, Virginia	
Rice, Marion Elaine.....	2	Ziska, Lillian	

Co-operative Students

Class of 1911

Beckett, Merrill Andrew.	MacDougall, Robert Marvin.
Doskocil, Erwin Robert.	Meyer, Carl.
Ehrlich, Ralph.	Moe, Sverre.
Erhard, Edwin.	Mooney, John Thomas.
Fork, William.	Nilson, Arthur N.
Gould, Russell E.	Rezab, William.
Hanna, John Clark.	Schroeder, Fred J.
Hitchcock, Frank H.	Schubert, George.
Hyde, Fred LeRoy.	Testal, Harvey.
Linderman, Arthur Theodore.	Valdes, Laurence.

Class of 1912

Allie, George.	Mueller, Jacob.
Blake, Arnold.	Murton, Robert.
Burnstein, Henry.	Smith, James.
Hill, David.	Smith, Joseph.
Johnson, Trygre.	Wallace, Everett.
Jordan, Chester.	White, Roy.
Kerrins, George.	

Class of 1913

Ahlgrim, Walter.	Kolar, Louis.
Boessel, Frederick.	Maly, Charles.
Clark, Myron.	Rehor, Otto.
Ewald, Robert.	Sandilands, James.
Gebel, Albert.	Sommers, Arwed.
Goodrich, Dwight.	Sramek, Otto.
Gregg, Gordon.	Tryner, Frank.
Gustafson, Harold Eugene.	Turner, George.
Hanna, Ellsworth.	Vincent, Roy.
Hartwell, John.	Wallace, Lee.
Hassell, Andrew.	Weiss, Andrew.
Jespersion, Harold.	Westgaard, Roy.
Johnson, Edward.	Williams, Charles.

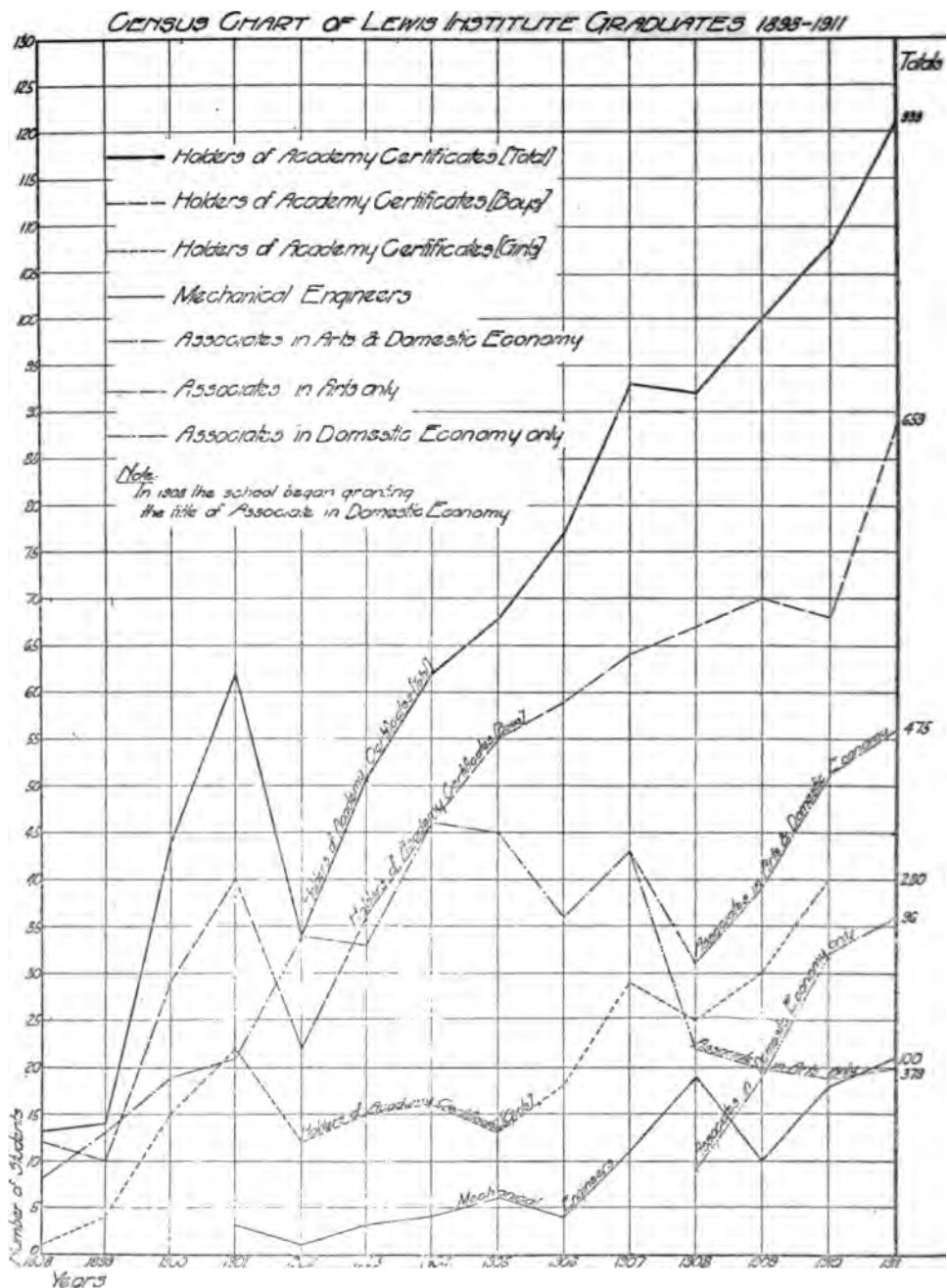
Co-Operating Firms

The following firms are co-operating with the Institute in the training of shop apprentices:

Acme Steel Goods Co., 2834 Archer Ave.
Aermotor Co., 1146 S. Campbell Ave.
Allis-Chalmers Co., Washtenaw Ave. and 12th St.
Benjamin Electric Co., 128 S. Sangamon St.
The Borland-Grannis Co., 310 E. Huron St.
H. W. Caldwell & Son Co., 17th St. and Western Ave.
Charles F. Elmes Engineering Works, 230 N. Morgan St.
A. Finkl & Sons Co., 2000 Hawthorne St.
E. Goldman & Co., 3900 Union Ave.
Goodman Mfg. Co., 4834 S. Halsted St.
Gregory Electric Co., 1601 S. Lincoln St.
Hanna Engineering Works, 2059 Elston Ave.
Kroeschell Bros. Ice Machine Co., 440 W. Erie St.
Latham Machinery Co., 306 S. Canal St.
Link Belt Co., 39th St. and Stewart Ave.
The Miehle Printing Press and Mfg. Co., 14th and Robey Sts.
National Biscuit Co., (Machine Shop,) Evanston, Ill.
Pelouze Electric Heater Co., 232 E. Ohio St.
Roth Bros. & Co., 1400 W. Adams St.
Simonds Mfg. Co., 1604 S. Western Ave.
Sullivan Machinery Co., 2624 W. Lake St.
Thordarson Elec. Mfg. Co., 216 S. Jefferson St.
Union Special Machine Co., 300 W. Kinzie St.
Weir & Craig Mfg. Co., 2425 Wallace St.
Weller Mfg. Co., 853 North Ave.
Fred W. Wolf Co., 827 Rees St.
Woods Motor Vehicle Co., 2500 Cottage Grove Ave.

Summary of Attendance, 1910-11

Students in Day Classes.....	1120
College Students.....	338
Men.....	125
Women.....	213
Academy Students.....	782
Boys.....	548
Girls.....	234
Students in Summer school only (1911).....	244
College Students.....	75
Men (Summer only, 12).....	28
Women (" " 36).....	47
Academy Students.....	187
Boys (Summer only, 57).....	122
Girls (Summer only, 56).....	65
Grammar School Students.....	83
Boys (Summer only).....	56
Girls (Summer only).....	27
Students in Evening Classes.....	2132
Engineering (Men).....	646
Mechanic Arts (Men).....	489
Mathematics.....	96
Men.....	82
Women.....	14
English.....	206
Men.....	151
Women.....	55
Domestic Economy.....	373
Cooking (Women).....	208
Sewing (Women).....	165
Chemistry.....	66
Men.....	61
Women.....	5
Latin.....	25
Men.....	15
Women.....	10
German.....	10
Men.....	2
Women.....	8
Italian.....	18
Men.....	2
Women.....	16
Pottery (Women).....	69
Bookbinding (Women).....	78
Physical Culture (Women).....	56
Total Day and Evening Students.....	3496



The chart shown above tells graphically the growth of the Lewis Institute student. The first class met September 21, 1896, but there were no graduates until June 21, 1898. statistics for 1898 are as indicated on the chart:

Academy certificate	-	-	13	Collegiate certificate	-	-	8
The statistics for June, 1911, thirteen years later, are as follows:							
Apprentices' certificate	-	-	17	Academy certificate	-	-	121
Title of Associate in Arts	-	-	22	Title of Associate in Dom. Econ.	-	-	36
Degree of Mechanical Engineer	-	-	21				

Summary of Treasurer's Report

The following statement summarized from the Treasurer's report shows the value of the property of the Institute and the income and expenditures for the year ending June 30, 1911. Most of the excess of the income over expenditures is used for equipment:

VALUE OF PROPERTY

Institute buildings.....	\$404,336.11	
Institute grounds.....	118,280.00	
Institute equipment.....	216,078.12	
Total		\$ 738,694.23
Real estate	\$679,157.58	
Bonds	162,000.00	
Stocks	4,500.00	
Mortgage loans.....	272,350.00	
Cash	5,463.95	
Other resources	9,501.91	
Total		1,132,973.44
Value of all properties.....		\$1,871,667.67

INCOME FOR YEAR ENDING JUNE 30, 1911.

Day school tuition.....	\$64,249.34	
Evening school tuition.....	22,142.00	
Summer school tuition.....	4,155.00	
Total		\$90,546.34
Net revenue from real estate.....	49,172.96	
Interest on bonds.....	8,949.95	
Stock dividends.....	400.00	
Interest on mortgage loans.....	16,123.16	
Other income.....	522.89	
Total		75,168.96
Income from all sources.....		\$165,715.30

EXPENDITURES FOR YEAR ENDING JUNE 30, 1911.

Instruction and school administration.....	\$111,776.57	
Engineers and janitors.....	13,692.42	
Shop and laboratory supplies.....	6,648.18	
Fuel and other supplies.....	14,737.03	
Repairs and alterations.....	1,590.88	
Student service.....	4,516.64	
Total		\$152,961.62
Business management	3,621.27	
Repairs	2,015.47	
Other expenses.....	938.48	
Total		6,575.22
Total expenditures.....		\$159,536.84
Excess of income over expenditure.....		6,178.46









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